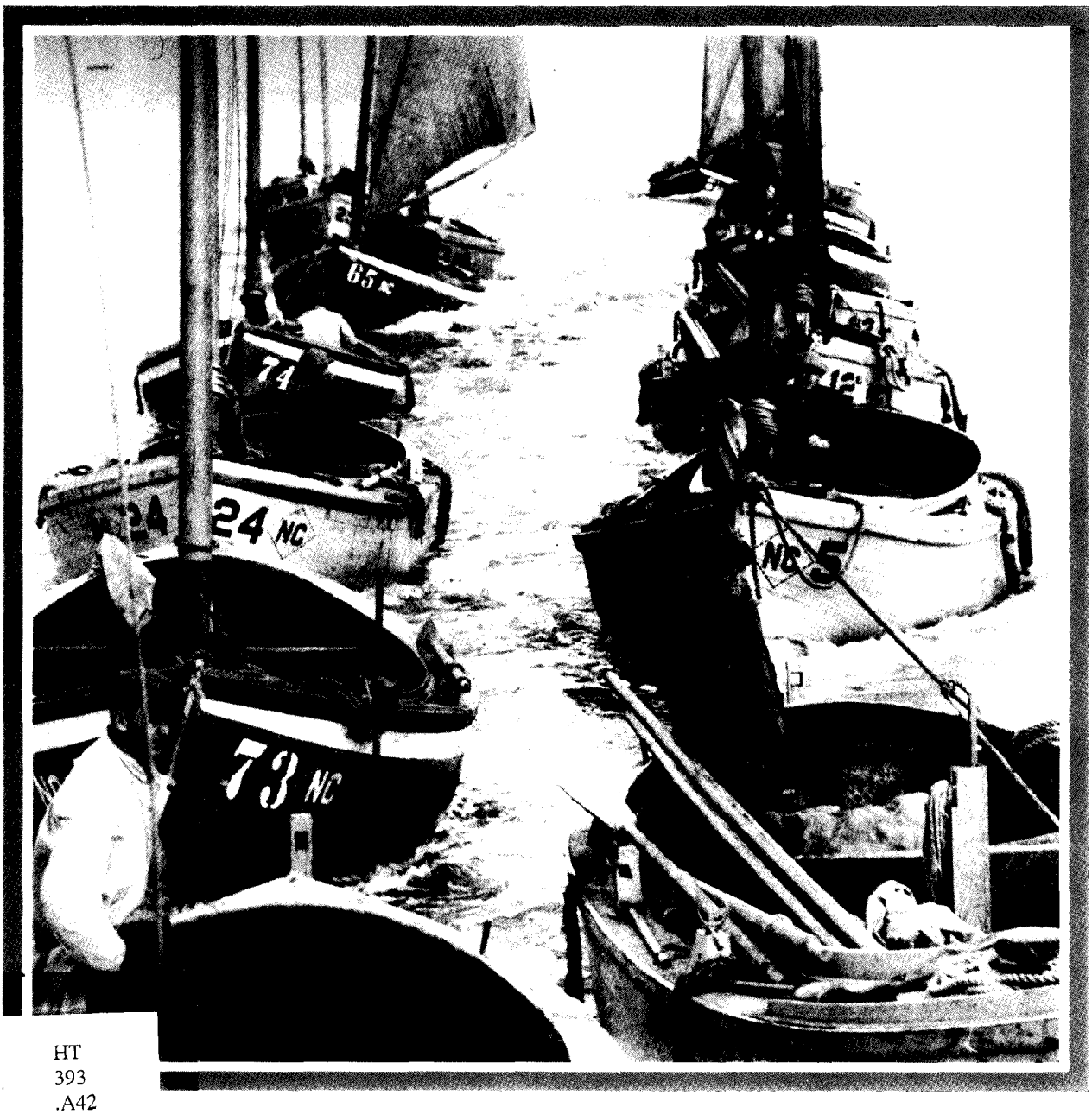
COASTAL MANAGEMENT PROGRAM
VOLUME II—MANAGEMENT PLAN



BRISTOL BAY BOROUGH

COASTAL MANAGEMENT PLAN

PUBLIC HEARING DRAFT

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SUMMARY

THE LAW

With coastal lands faced by mounting pressure for development and use, Congress in 1972 passed the Coastal Zone Management Act providing incentives for coastal states to protect, manage, and, where possible, rehabilitate the coastal resources. In 1977 the Alaska Legislature passed the Alaska Coastal Management Act making local governments responsible for managing the coast within their jurisdiction and requiring each to prepare a district coastal management plan.

THIS REPORT

Chapters 1 through 3 present background data of the coastal management program and a summary of the first phase of the program, the resource inventory. The rest of the book presents the newest phase of the program, the management plan. Chapter 4 presents general management policies and specific policies relating to each land or water classification. Chapter 5 discusses the implementation process.

Because only a small portion of Bristol Bay's 500 square miles is accessible by road, mapping of habitats by onsite analysis was impossible. A variety of means was used to establish habitats, but the main source was a land cover map developed from digital Landsat and digital topographic data and coded for a range of vegetation cover types. This process allows, for the first time, reliable determination of habitat in the Borough's inaccessible areas.

GOALS AND OBJECTIVES

The Bristol Bay Borough, working with community representatives and the coastal management steering committee, developed goals and objectives detailing needs and future plans for the Borough. Three series of community meetings were held in the Borough during development of the program. The goals and objectives of the management plan are the result of that community involvement.

RESOURCE INVENTORY

The Physical Setting

The majority of the land has poor surface drainage resulting in standing water and wet or moist tundra. Most of the Borough is moraine and glacial drift and, in the low-lying areas, alluvial floodplain and glacial outwash deposits which are suitable foundation material. There is adequate land within the developed area of the Borough to support contemplated highway and building construction and to provide the necessary construction materials.

The Borough's communities, though protected from tsunami hazards, are threatened by high-energy coastal erosion. The earthquake potential is low but the coastal and river bluffs present significant landslide and erosional hazards due to unstable geologic formation and soils. Volcanic activity in the area is extreme, and ash deposition is the primary hazard.

The Natural Setting

Marine mammals, moose, caribou, birds and a variety of fish are migratory and spend a portion of the year in the Borough. Kvichak Bay and the Naknek River serve as primary migration corridors for most of Bristol Bay's salmon. Paul's Creek, King Salmon Creek, Big Creek, Naknek Lake, and the Naknek River are primary salmon spawning and rearing areas.

Man's Use

Fish processing represents the majority of industrial land use in the Borough. There are about 20 cannery or processing sites that occupy up to 40 acres each. Adequate land for future housing and commercial development is available for growth over the next 20 years, based on demand forecasts. Most land in the Borough is in its natural state and is used for recreational purposes and subsistence hunting, trapping, and gathering. Water bodies in the Borough are more intensively used than the land, mainly for fishing and transportation.

Population growth has been slow to moderate in the past 10 years and is expected to remain so in the future; population increases from just over 1,000 to about 4,000 during the salmon season. Commercial fishing is the mainstay of the Borough economy. Government employment, seasonal construction and subsistence activities also contribute significantly. Seasonal unemployment is a chronic problem.

RESOURCE ANALYSIS

Because of its relatively isolated location and cultural heritage, commercial fishing, subsistence hunting and fishing, and, to a lesser extent, recreational hunting and fishing play an important part in the lives of many residents. It is difficult to evaluate the sensitivity of habitats and the effects of development on habitat quality since impacts are so site- and project-specific; however, as Bristol Bay Borough continues to grow, losses in types and quality of habitat are unavoidable.

To effectively evaluate land and water uses and develop management recommendations, Borough lands were divided into the following categories.

Offshore areas
Estuary
Tideflats
Exposed high-energy coasts
Rivers, streams, and lakes
Uplands
Wetlands

Generally, upland tundra receives the least amount of wildlife use. The Naknek River, major creeks, fresh and saltwater marshes, and associated riparian areas receive the most intense wildlife use.

POLICIES

Policies developed as part of the management plan will be used by the Borough Planning Commission and Assembly to determine proper and improper uses of resources and the acceptability of proposed plans and projects. Policies will be applied as long as they are consistent with sound engineering practice and do not result in economic, social, or environmental problems that outweigh the public benefit derived from strict compliance with the policy.

General Policies

When planning waterfront development development, priority shall be given in the following order to:

Water-dependent uses and activities
Water-related uses and activities
Other uses and activities for which there is no feasible inland alternative

High priority shall be given to maintaining and increasing public access to coastal water. Recreational and visual access to coastal areas shall be provided where consistent with public safety and private property rights. Transportation and utility routes and facilities must be sited inland from beaches and shorelines unless the route or facility is water-dependent or no feasible inland alternative exists.

Maintenance and enhancement of fisheries shall be given priority consideration in reviewing proposals which might adversely impact fisheries habitat, migratory routes, and harvest of fish or shellfish species.

Multiple use of the shoreline shall be encouraged where new uses or activities do not interfere with priority uses. Permitted development and activities shall not significantly degrade the quality of the natural environment, nor contribute to erosion or other deleterious effects on adjacent land.

Permitting activities or uses in the Borough must conform with all applicable federal and state regulations, and implementation of government services and facilities for the public shall be in conformance with applicable plans, policies, and programs of the Bristol Bay Borough.

Subsistence use, where predominant within the publicly owned areas of the coastal zone, shall be given primary consideration in determining resource allocations.

Specific Policies

Offshore and Estuarine Areas

As an offshore area Kvichak Bay must be managed as a fisheries conservation zone to maintain or enhance the state's sport, commercial, and subsistence fishery. As an estuary, Kvichak Bay and the lower 10 miles of the Naknek River must be managed to assure adequate waterflow, natural circulation patterns, nutrients, and oxygen levels, and avoid the discharge of toxic wastes, silt, and destruction of productive habitat.

Exposed High-Energy Coasts

High-energy coasts must be managed by assuring the adequate mix and transport of sediments and nutrients and avoiding redirection of transport processes and wave energy. Development along the coastal bluffs shall be set back in accordance with all applicable state and federal regulations.

Important Upland Habitat

Uplands must be managed to maintain or enhance the biological characteristics of the habitat which contribute to its capacity to support living resources. Highways, residential and secondary roads shall be constructed using overlay methods. Roads shall not be routed through marshes or wet bogs and meadows, and drainage patterns should be maintained.

Both caribou and moose calve from May 20 through June 8 and general ranges are mapped in the resource inventory. Construction activities through these areas shall be avoided during this critical period.

Wetlands and Tideflats

Wetlands and tideflats must be managed to assure adequate water flow, nutrients, and oxygen levels and avoid adverse effects on natural drainage patterns, destruction of important habitat, and discharge of toxic substances.

Rivers, Streams, and Lakes

Rivers, streams, and lakes must be managed to protect natural vegetation, water quality, important fish or wildlife habitat and natural water flow. To preserve stream bank and channel integrity, new construction or land clearing shall set back from the water's edge in accordance with all applicable state and federal regulations.

IMPLEMENTATION PROCESS

For a district coastal management program to work effectively and efficiently, it must meet the regulatory needs and administrative capabilities of the local government. Depending on the type and scale of a project, the Borough provides routine approval or formal review. Most building permits, zoning changes, and plat approvals for individual residences require only routine administrative review. Formal review is required for all federal and state consistency determination recommendations requiring "great weight" consideration, for all major activities needing only local approval as determined necessary by the Borough Planning Commission, and for all activities involving a performance standard established by a management policy.

When a project must be reviewed for consistency with the management program, the reviewer uses the checklist shown on page 80. If the project or activity is not consistent, the reviewer states what specific portion of the program is affected, specific remedial action recommended, and the rationale for requesting action. This review should be completed within 30 days.

CHAPTER ONE

THE PROGRAM

BACKGROUND

The coast of the United States has long been one of our country's greatest assets. Coastal habitats contain a wealth of resources that have both natural and economic value. America's coast is unique, productive, and diverse. Though the coast seems endless and the coastal areas vast, both have limits which must be acknowledged and respected. With much of our coastal areas settled and pressure for development and use increasing, Congress in 1972 passed the Coastal Zone Management Act. The act provides incentives for coastal states to protect, manage, and, where possible, rehabilitate the coastal resources. In 1977, the Alaska Legislature passed the Alaska Coastal Management Act which established a process for protecting and managing the coastal resources of the state. The legislature made local government responsible for managing the coast within its jurisdiction and required each to prepare a District Coastal Management Plan.

The Bristol Bay Borough, as an organized local government, is a coastal resource district. As a borough, it has authority for planning and zoning within its boundaries, and as a coastal resource district, it has responsibility for developing and implementing a coastal management program that meets the standards and guidelines of the Alaska Coastal Management Program.

PURPOSE

While writing the Alaska Coastal Management Act in 1977, the legislature outlined its purpose in developing such a law in Alaska. The following summarizes the purpose of the Alaska Coastal Management Act of 1977:

- Preserve, protect, develop, use, and, where necessary, restore or enhance the coastal resources of the state for this and succeeding generations.

- Encourage coordinated planning and decision making in the coastal area among levels of government and citizens using the coastal resources of the state.

- Develop a management program with policies, objectives, and procedures to guide and resolve conflicts among public and private use of resources impacting the coastal land and water of the state.

- Assure the participation of the public, local governments, and agencies of the state and federal governments in the development and implementation of a coastal management program.

- Utilize existing governmental structures and authorities, to the maximum extent feasible, to achieve the policies set out in this section.

- Authorize and require state agencies to carry out their planning responsibilities and to take actions affecting the use of the resources of the coastal area in accordance with the policies set out in this section.

REQUIREMENTS

The Bristol Bay Coastal Management Program contains the following:

- Goals and Objectives: The identification of the present concerns and desires for the future by the people living within the Bristol Bay Borough.

- Coastal Boundaries: The determination of the land and water area included within the district coastal management program.

- Resource Inventory: An identification and description of the natural, physical, and cultural resources within the district. The resource inventory emphasizes those resources that are basic to man's well-being, and it forms the basis for the management plan.

- Resource Analysis: A summary of the demand for the Borough's resources and the type and scale of development expected in the future. An identification and description of the important habitats within the Borough as well as recommendations for their management.

- Uses: A description of the type of land and water use and the determination of proper and improper uses included in the Borough's program.

- Management Policies: Policy statements that guide coastal land and water uses.

- Implementation: A description of the method and process used to implement the district program.

It is important to keep in mind, while considering any aspect of the Bristol Bay District Program, that the program was designed and developed not just

to satisfy the requirements of the act or the standards and guidelines, but to establish a foundation on which a comprehensive planning program could be built. The program is a comprehensive planning tool that provides the Borough with the information necessary to make reasonable planning and zoning decisions that could impact the communities and their resources long into the future.

MANAGEMENT PROGRAM, VOLUME I AND VOLUME II

The Bristol Bay Borough Coastal Management Program is divided into two volumes. Volume I is the resource inventory and Volume II is the management plan including goals, resource analysis, management framework, uses, coastal policies, and implementation approach.

Volume I, Resource Inventory

The resource inventory is a review of the physical, natural, and man-made resources within the Bristol Bay Borough. It is a narrative and a series of maps, produced in an oversized format, to describe the nature and distribution of the resources found throughout the coastal district.

Volume II, Management Plan

The management plan includes the remainder of the program requirements. It is a narrative and series of maps, produced in book format, which includes:

- Description of community goals and objectives
- Resources analysis

- Habitat evaluation
- Management recommendations
- Recommended areas which merit special attention (AMSA)
- Uses within the management area
- Coastal policies
- Implementation process

CHAPTER TWO

THE SETTING

THE REGION

Recorded history began in the Bristol Bay region in 1819 with the arrival of Russian traders. The first Russian settlement was established in 1820 and in 1841 the first Russian Orthodox mission was built at Nushagak. From there, the Russians explored and maintained dominance over the region until 1867. In 1884 the first salmon cannery was built at Nushagak, and in 1890 Cress P. Hale built the first cannery on Kvichak Bay at Pederson Point. By 1900 there were a dozen canneries on the shores of Bristol Bay.

The Bristol Bay region is one of the most productive areas for fish and wildlife in Alaska. It is the heartland of the world's salmon fishery and abounds with waterfowl, caribou, moose, bear, and a variety of smaller mammals. In addition to commercial salmon fishing, fish and wildlife are taken for subsistence and recreation purposes by both local and nonlocal hunters and fishermen.

A number of fish, mammal, and bird species are migratory and spend only a portion of the year in the Bristol Bay Borough. The remainder of the year is spent traveling in or out of the Borough to seasonal habitats. Salmon, caribou, bear, and a variety of birds are migratory and travel through the Borough at various times of the year.

The Bristol Bay region has a marine climate with cloudy skies, relatively mild temperatures, and moderate precipitation. The area has cool summers

with average summer maximum temperature of 50 to 60 degrees F. Winters are warm with average minimum temperatures of 6 to 20 degrees F. Extreme temperatures are -42 and +88 degrees F. Annual rain averages about 20 inches and snow averages about 45 inches.

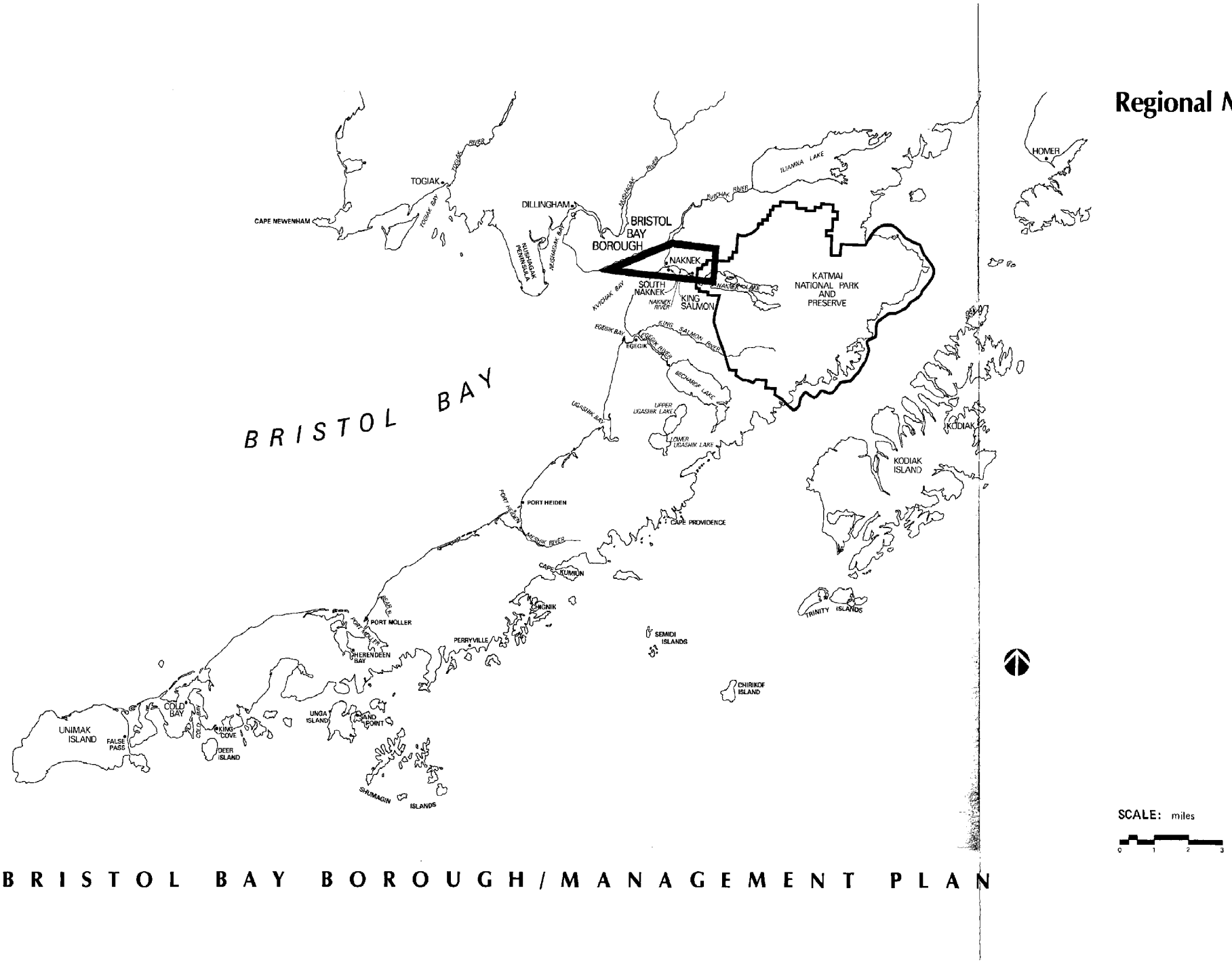
Bristol Bay is approximately 58,000 square miles in area, with an average depth of 192 feet. The Inner Bay, extending northward from Port Heiden to Cape Newenham, covers 9,700 square miles and splits at its head, forming Kvichak Bay and Nushagak Bay. Tidal fluctuations in the bay are extreme, with higher ranges toward the head. The mean tidal range at Port Heiden is 7.5 feet and at Naknek, 18.5 feet.

The Naknek River drainage area is approximately 3,700 square miles. The Naknek River watershed includes seven interconnecting lakes: Murray, Hammersly, Coville, Grosvenor, Brooks, Idavain, and Naknek, and the Naknek River, as well as numerous tributaries. Sixteen streams flow into the Naknek River.

It is important to keep in mind that the land area within the Bristol Bay Borough is only part of the physical, natural, and cultural system of the region and that the entire system extends well beyond the Borough boundaries. For example, the Bristol Bay salmon fishery, the world's largest, is partially dependent upon fish traveling through the Borough to primary spawning areas in the Kvichak and Naknek River systems outside Borough boundaries. This is also the case for caribou, moose, and bear.

The regional map extends from Unimak Island in the south to Lake Illiamna in the north, and Kodiak Island in the east to the Kuskokwim Delta in the west (see Regional Map).

Regional Map



THE BOROUGH

The Bristol Bay Borough is approximately 500 square miles in area and extends from the foothills of the Aleutian Range in Katmai National Park to the western shore of Kvichak Bay.

The east side of Bristol Bay Borough encompasses the majority of the usable land and the communities of Naknek, South Naknek, and King Salmon (see Borough Map). The west side primarily contains Kvichak Bay and land extending to the western boundary of the coastal watershed. The western Borough boundary runs along the western mean high tide line of Kvichak Bay. The base map extends west of the mean high tide line to include the coastal watershed that drains into Kvichak Bay and consequently into the Borough.

The biophysical boundary, delineating the coastal zone in the Borough, is established by the Biophysical Boundaries of Alaska's Coastal Zone, and illustrated on the topographic map in the resource inventory. This boundary approximates the 200-foot contour and includes over 75 percent of the land and water area within the Borough boundaries. All transitional and intertidal areas, salt marshes, saltwater wetlands, islands and beaches are within the biophysical boundary.

The Bristol Bay Borough chose to extend the district boundaries beyond the established biophysical boundaries to include important areas of direct influence and to conform to the Borough's political jurisdiction. Establishing the Borough boundaries as the program boundary incorporates the following areas above 200 feet elevation found in the Borough:

- The foothills of the Aleutian Range found in the northeast corner of the Borough. These hills provide important uplands habitat and form the upper drainage of King Salmon and Paul's Creeks.

- The ridge separating the Naknek Lake and Naknek river systems which drain into primary salmon spawning areas.

- The hills in the southwest corner of the Borough which drain into the Naknek River and Kvichak Bay, both important anadromous fish migration routes.

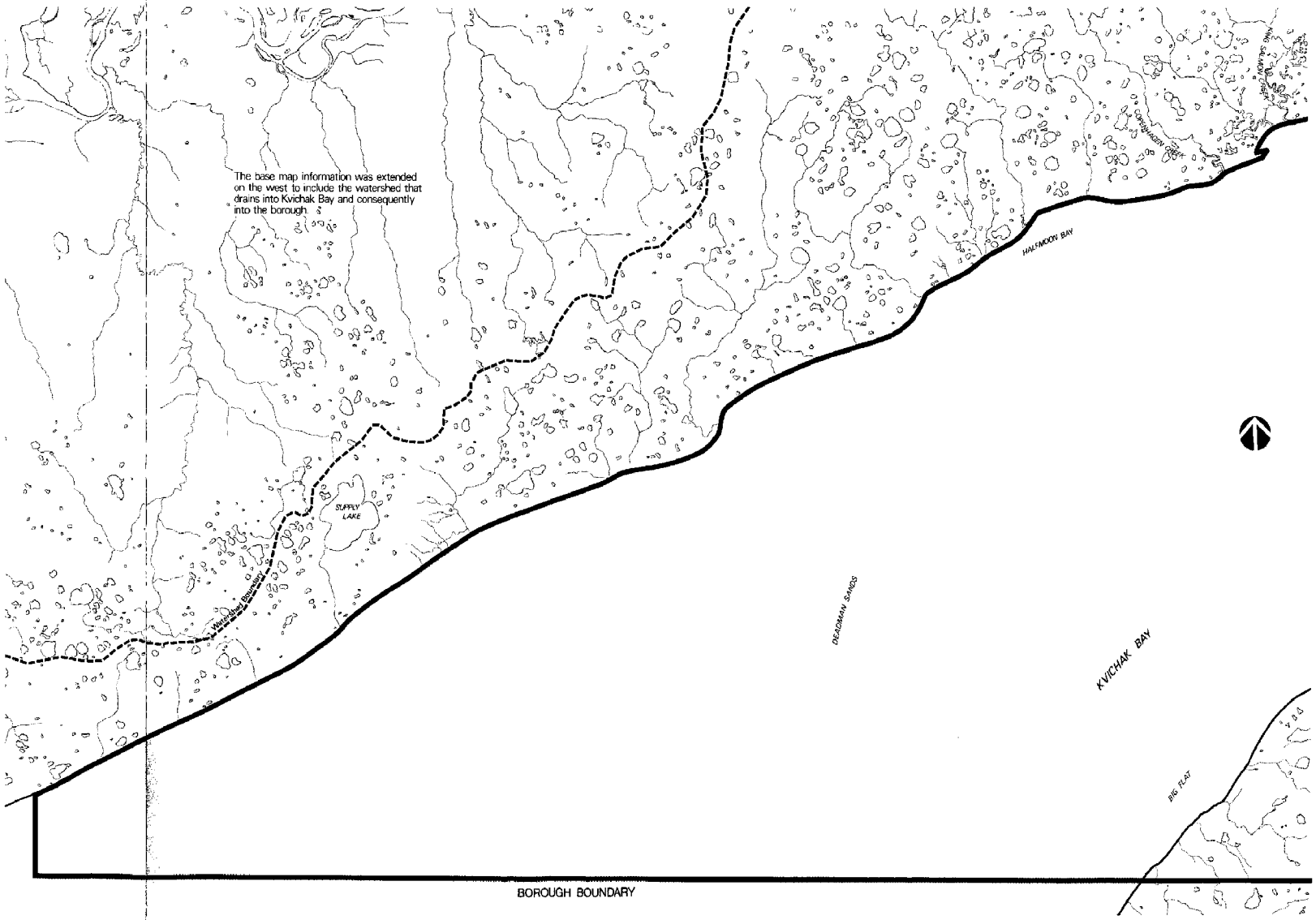
The Bristol Bay Borough coastal management district is surrounded by the Bristol Bay region coastal resource service area. This service area has been designated, organized, and is presently developing its coastal management program. The Borough's district boundaries were designated to be compatible with the contiguous service area.

THE COMMUNITIES

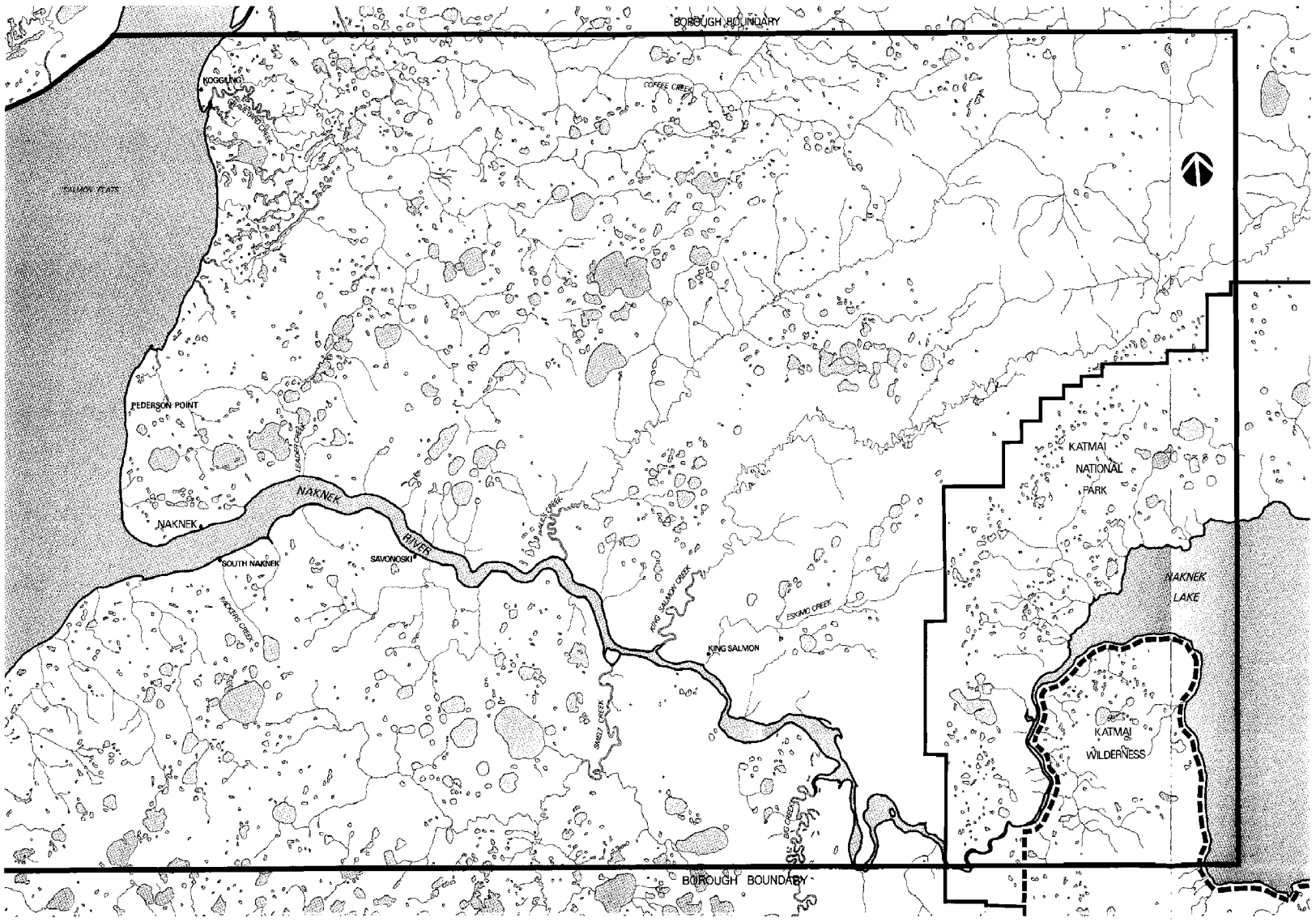
Naknek

Naknek developed around a Russian Orthodox church, built on the banks of the Naknek River in the 1800s. The community grew out of the salmon fishery and, today, is the heart of the Pacific salmon fishing and processing industry and the seat of Borough government.

Naknek, with the largest permanent population, offers the greatest variety of goods and services in the Borough. Over the past few years, the community has experienced moderate growth. There is a regional high school in Naknek, which serves the entire Borough, a grade school, and a preschool for


The base map information was extended on the west to include the watershed that drains into Kvichak Bay and consequently into the borough.
HALFMOON BAY
COPPERMINE CREEK
SLAPPY LAKE
Watershed Boundary
DEADMAN SANDS
KVICHAK BAY
BIG FLAT
BOROUGH BOUNDARY

Borough Map


BOROUGH BOUNDARY
KOGGIUNG
COFFEE CREEK
SALMON FLATS
PEDERSON POINT
LEADFISH CREEK
NAKNEK
NAKNEK RIVER
SOUTH NAKNEK
SAVONOSKI
PACKERS CREEK
KING SALMON CREEK
ESKIMO CREEK
KING SALMON
SHELL CREEK
BIG CREEK
KATMAI NATIONAL PARK
NAKNEK LAKE
KATMAI WILDERNESS
BOROUGH BOUNDARY
SCALE: miles
0 1 2 3

the community. There are Borough offices, a hotel, restaurants, a health clinic, civic center, fire station, and a variety of offices including Paug Vik, the village corporation for Naknek and major landowner in the Borough.

South Naknek

South Naknek, an early Native village, developed around the canneries built at the mouth of the Naknek River. The community is the smallest in the Borough. There is an elementary school in South Naknek, but high school students are flown to Naknek daily to attend high school. A recreation hall houses an office for South Naknek's village corporation and the village council and has the only telephone in the village. The Alaska Packers Diamond NW cannery is located on Packer's Creek in the center of the village, and four other canneries are located close to South Naknek on the river bluff. Two of these canneries are not functioning at this time. The community has a store, an airstrip, and a firehouse/maintenance facility.

King Salmon

King Salmon originated as an air navigation site built in the 1930s. In 1943, the site was converted to the Naknek Air Force Base and subsequently became the King Salmon Air Force Base. King Salmon grew as a result of World War II and was connected to Naknek by road in 1949. A long, paved runway and modern facilities make King Salmon the major airport in the region. State and federal government agencies are located in King Salmon because of the accessibility and the convenience of the services supporting the Air Force Base.

King Salmon has a store, hotel, and restaurants. A dock facility and boat launch is provided on the Naknek River for recreational users. The community has modern housing and a residential area is planned along King Salmon Creek. King Salmon is a departure point for sportsmen and recreational users traveling to other parts of the region and to Katmai National Park.

GOALS AND OBJECTIVES

The Bristol Bay Borough, working with community representatives and the coastal management citizen advisory committee, developed goals and objectives detailing needs and future plans for the Borough. Three series of community meetings were held in Naknek, South Naknek, and King Salmon during development of the program. The following goal statements are a result of the community involvement.

Land Use Planning

Goal: Actively pursue sound land use planning which helps guide the future growth and development of the Borough and its communities.

The Bristol Bay Borough has responsibility for planning and zoning within its boundaries. There is a need for sound land use planning within the Borough to guide the development of the area according to the desires of its residents.

Long-Range Development Plan

Objective: Prepare and periodically update a comprehensive development plan.

The current comprehensive plan for the Bristol Bay Borough is obsolete. To adequately plan for the future needs of the Borough it is necessary to prepare a long-range development plan, taking into consideration potential developments such as servicing the petroleum industry and future bottomfish processing.

Coordination of Efforts

Objective: Coordinate land planning, development, and management with state and federal entities.

To date, intergovernmental coordination has been lacking, and governmental planning and programs have been redundant. Due to recent efforts by state and federal governments, coordination in the Bristol Bay region is beginning to take place. The opportunity exists for the Borough to work in concert with a variety of government agencies in the area of planning, data collection, program development and implementation, and land management.

Data Update

Objective: Develop a current data base including base maps, resource inventory, etc., to support wise planning and land use decisions.

Land use planning decisions need to be based on current information. At present, resource data and base mapping for the Borough is sketchy and outdated.

Natural Hazards

Objective: Identify potential hazards and minimize potential impacts through wise land use planning.

Natural hazards such as landslides and flooding have threatened lives and caused property damage. Though difficult to prevent, it is possible to lessen the impact of these natural occurrences.

Community Development

Goal: Plan for and guide the present and future development of the Borough and its communities.

Areas of the Bristol Bay Borough have been settled and used for centuries. Since 1900 the villages of Naknek, King Salmon, and South Naknek have grown and developed into permanent communities that support a resident population. It is important to maintain the health of these communities and guide their future development.

Housing

Objective: Plan for and promote housing rehabilitation and adequate new housing to meet both the current and future demand.

Currently, there is a demand for suitable housing in the Bristol Bay area. Many of the dwelling units are old and in need of repair. There is also a shortage of adequate rental housing in the area. The housing situation is multifaceted including such problems as the lack of buildable land, high land costs, mortgage rates, etc.

Objective: Plan for and assist in providing adequate seasonal housing for the seasonal work force.

During the Bristol Bay commercial fishing season, there is an influx of several thousand transient workers. Most of the canneries provide some housing for their workers. However, there are far more workers than there are accommodations. Hundreds of people are forced to camp throughout the area, causing sanitation problems and destruction of private property, and negatively impacting the environment and scenic values.

Commercial Development

Objective: Maintain existing commercial services within the Borough.

Objective: Identify and set aside primary commercial land within the Borough for future commercial development.

Objective: Encourage and give priority consideration to water-dependent commercial development for future waterfront use.

Objective: Encourage marine and related commercial activity to support an existing and expanding fishing industry.

Commercial development within the Borough supports both the resident population and a seasonal in-migration related to the fishing industry. Commercial activities and development provide positive economic benefits to the Borough and its communities. As the population grows and the fishing industry expands, new commercial opportunities will evolve. To take advantage of these opportunities it is necessary to plan for and promote commercial activity.

Public Facilities

As in any regional center, a need exists for public facilities to support a variety of activities involving the communities and their residents. The areas important to the Borough and in need of consideration are: schools, fire protection, public safety, sports/recreation, and transportation.

Objective: Work with the school district and the communities to maintain and enhance existing schools to serve both educational and community needs.

Education is a primary responsibility of the Borough, assumed by the Borough school board. Public schools within the district serve not only as educational facilities, but also as meeting places and community centers, offering a variety of recreational opportunities. The facilities are important to the community and need to be maintained for the benefit of the entire area.

Objective: To maintain existing fire protection to serve the communities within the Borough and to expand the fire protection capacity to fight industrial and marine fires.

Fire protection is essential to minimize personal injury and property damage. A basic need within the Borough is to expand the fire protection capability to cover industrial and marine related facilities. In the past, boats and canneries have been severely damaged by fire, due to the lack of adequate equipment.

Objective: Plan for and develop a public safety facility that includes a detention center, residence, offices, etc.

The Borough is in need of a detention facility. At the present time, there is no such facility; persons arrested for infractions requiring detention must be transported to either Dillingham or Anchorage.

Objective: Maintain existing sport and recreational facilities within the Borough and plan and develop additional facilities on an as-needed basis.

The school gym and the rifle range are good examples of the kind of sports and recreational facilities that can be made available to the Borough residents. The need and value of these facilities are well known and the benefits to both young and old are immeasurable.

Transportation

Objective: Repair the highway from King Salmon to Naknek and maintain the road year-round.

Objective: Upgrade the existing local roads to a service road standard and set standards for all new local road construction.

Transportation within the Borough is essential for moving goods and services and for maintaining the industrial base. At present, there is a paved highway in need of repair connecting Naknek and King Salmon and a variety of local roads which remain unimproved.

Objective: Work with the State Department of Transportation and Public Facilities to determine the feasibility, to plan for and to develop the appropriate elements of a regional transportation system including ferry service between the Borough, other regional centers, and the Alaska highway system, and a bridge servicing Naknek and South Naknek and making the Alaska Peninsula accessible to the Bristol Bay Borough.

Utilities

Objective: Develop, if feasible and cost effective, an area-wide utility system that provides adequate service to each of the Borough's communities.

A utility system including sewer, water, waste disposal and electricity is a basic service to be provided by local government. The need for these utilities exists in all three communities.

Parks and Recreation

Objective: Maintain and increase recreational opportunities within the Borough by developing a park and recreation master plan which identifies the demand for recreation within the Borough, identifies and recommends conservation of primary recreation and scenic areas, increases and maintains controlled public access to the waterfront, and recommends recreational programs for Borough residents.

Outdoor recreation within the Borough is a matter of lifestyle and widely affects the quality of life of the Borough residents. The benefits of recreational opportunities can be measured in terms of healthy families and individuals, reduced crime rates and increased tourism. Ways to promote recreational opportunities include conserving land and water used for recreation, providing access and facilities for recreational areas and planning and developing area-wide recreational programs.

Economic Development

Goal: Strengthen the economy of the Bristol Bay Borough by encouraging economic development that provides employment opportunities on a year-round basis and maintains and expands the existing employment base.

The economy in the Bristol Bay Borough is primarily dependent upon commercial fishing, an industry characterized by its short, intensive seasons. A majority of the Borough residents are employed in the fishing industry between May and August. The construction industry, to a lesser extent, also provides employment opportunities, but it is also seasonal and coincides

with commercial salmon fishing. State, federal, and local government is the major year-round employer.

Commercial Fishing

Objective: Prepare a fisheries development plan that identifies opportunities for maintaining and expanding the commercial fishing industry in the Borough, and recommends a program for taking advantage of the opportunities available to the community.

Objective: Set aside primary coastal areas and uplands for priority use by the commercial fishing industry and develop the necessary infrastructure (i.e., waste disposal, transient housing water sources, etc.) necessary to accommodate industrial development.

The potential exists for expanding the fishing industry by encouraging bottomfish and shellfish harvest and processing, by developing fish waste processing and by promoting the development of small-scale processing and marketing of salmon outside of the peak season.

Tourism

Objective: Increase the opportunities for tourism and recreational use in the Borough that stimulates economic development and minimizes negative environmental and social impacts.

Objective: Promote the development of tourist and recreational facilities within the Borough.

The Bristol Bay region contains a wealth of natural beauty, fish and wildlife and wilderness areas. The area is intensively used by backpackers, boaters, hunters, fishermen, and tourists from both inside and outside of Alaska. With the creation of a number of new national parks and the expansion of the Katmai National Park, the use of the region as a recreational and tourist area will continue to increase.

Industrial Development

Objective: Encourage industrial development that is compatible with community values and the natural resources within the region.

Objective: Identify and set aside land suitable for industrial development within the Borough.

Objective: Assess and, if feasible, develop support facilities and management programs to encourage oil, gas and mineral extraction and timber harvest that promotes positive economic impacts and minimizes negative environmental impacts.

In addition to commercial fishing there are other industries that could locate or develop within the Bristol Bay Borough, such as boat haul-out, repair and storage, service of oil and gas development, mining, etc. These industries could provide year-round employment or employment opportunities that may be compatible with the fishing industry.

Land and Water Management

Goal: Protect important cultural and historic areas as well as critical natural habitat in the Bristol Bay Borough.

Objective: Prepare and implement an integrated land and water management program, including intergovernmental coordination, comprehensive planning, Borough-wide zoning, and subdivision regulations.

Subsistence hunting and fishing occurs on land and water within the Borough having important fish and wildlife habitat.

Subsistence

Objective: Identify and conserve areas predominantly used for subsistence hunting, fishing and foraging.

Objective: Provide public access to these areas traditionally used by Borough residents.

Subsistence hunting, fishing, and foraging represents an important part of the Borough residents' lifestyle and culture and contributes to the families' health and well being.

Historic and Cultural Preservation

Objective: Identify archaeological, prehistoric and historic areas and sites within the Borough.

Throughout the Borough there are areas of historic value that represent the beginning of man's history and his use of the land and water.

Fish and Wildlife

Objective: Minimize impacts of increased pressure and maintain populations by protecting important spawning and migration areas of salmon and resident sport fish species.

There are a variety of fish species found in the river, stream and lake systems in the Borough. Salmon are valuable both as a commercial and subsistence food source and as sport fish stock. Other species are harvested as a food source and for sport. A number of these species migrate and spawn throughout the Borough. Increased sport fishing has placed undue pressure upon some fish stocks.

Objective: Maintain and increase large mammal populations by protecting important wintering grounds, calving grounds, denning areas, and migration routes.

Increased sport and subsistence hunting of moose, bear, and caribou is putting pressure on these large land mammals.

Objective: Maintain the existing water quality within the Borough and protect marine mammal feeding and haul-out areas.

Marine mammals are found in the Naknek River system and in Kvichak Bay. The mammals are sensitive to polluted water and to the disturbance of feeding and haul-out areas.

Objective: Provide suitable wetland areas for local nesting and migratory waterfowl by protecting coastal and inland areas from draining, pollution, and other detrimental impacts.

Land and water within the Borough provide nesting and staging areas for a variety of waterfowl species. Adequate water levels and unpolluted water is important to maintain in these areas.

Objective: Provide ample opportunity to use all wildlife species for recreation by protecting denning, feeding, nesting, and wintering areas for small animals and birds.

Small fur-bearers and nongame birds are not only important for aesthetic and recreational value, but also are integral to the total ecology of the area. Many of the game animals need large populations of these smaller animals to feed upon.

CHAPTER THREE

RESOURCE ANALYSIS

ECONOMIC PROFILE

The objective of the economic profile is to provide the information necessary to assess the present and future demand for the resources found in the Bristol Bay Borough. The profile is general, but examines both population and employment, the two most important determinants affecting local demand. The profile estimates both the type and scale of proposed development projects on the local economy and the potential for major economic activity affecting the structure of the regional economy. For a more detailed explanation of the Borough's economy, see the economy section of the Bristol Bay resource inventory.

Population

The population of the Bristol Bay Borough has remained fairly stable over the past two decades, with a trend toward slow to moderate growth (Table 1). The population increased by 207 people or 22 percent between 1960 and 1970, an average annual growth rate of 22 percent. During the last 10 years, the growth rate declined to 10 percent as there were 103 new residents to the Borough. Using an average annual growth rate of 1.6 percent computed from a 20-year average, the Borough population will increase 215 people by 1990, increasing the total population to 1,465 residents. Slow to moderate growth is consistent with population trends throughout the region and can be expected to continue in the near future.

TABLE 1

BRISTOL BAY BOROUGH POPULATION

	1960 Census	1965 ASHA*	1970 Census	1980 Census	1981 Borough
King Salmon	227	200	202	196	374
King Salmon AFB	322	350	403	340	371
Naknek	249	306	318	317	369
South Naknek	142	116	154	147	136
Other	--	--	70	94	--
Total	940	972	1,147	1,094	1,250

*ASHA - Bristol Bay Comprehensive Development Plan, Alaska State Housing Authority

In addition to a stable resident population, seasonal fluctuations occur during the summer fishing season. With the opening of the season comes renewed employment opportunities both in fishing and in fish processing. Approximately 3,000 people enter the Borough in June and remain until the canneries close in late August or September.

Employment

In the Bristol Bay Borough, as in the region, commercial fishing is the industry most important to the economy. Fishing and fish processing provide ample summer employment for both the permanent and seasonal residents of the Borough and contribute the highest proportion of total annual employment.

Unemployment in the Borough remains a chronic problem which permanent residents face during the remainder of the year. Figure 1 illustrates the nature of seasonal employment and the extent of unemployment throughout the year. It is important to note that unemployment in the Borough has been typically well above the statewide average. Government, traditionally one of the most important employers in Alaska, provides the largest amount of year-round jobs in the Borough. The federal, state and local governments employ approximately 118 people annually. There are approximately 36 land-based businesses located in the Borough that supply goods and services to both the permanent and seasonal residents and support government activity, including the 340 people at King Salmon Air Force Base.

Subsistence hunting and fishing is an important part of the Borough residents' livelihood. There were approximately 211 subsistence permit holders from the Borough and an additional 147 permit holders from outside the area in 1980. A total of 358 permit holders took over 20,000 salmon during the season. Moose, caribou and waterfowl also provide subsistence food sources to the Borough residents.

Major Economic Activity

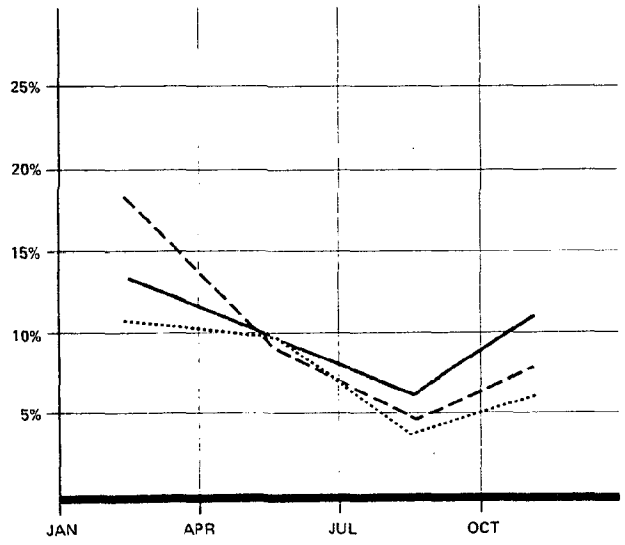
The Borough's economy is very basic. Fishing, the Borough's primary industry, provides seasonal employment for permanent residents. Local, state and federal governments provide the largest amounts of year-round employment. Subsistence hunting and fishing continues to play a significant role in the local economy. Tourism and the construction industry are primarily limited to the summer months.

There are basically two types of impacts that could have a major effect on the local economy. The first is any occurrence that could affect the fishing industry itself, i.e., changes in technology, availability of fish, etc. The second is any occurrence that could generally affect the seasonal nature of the present Borough's employment base, i.e., year-round employment opportunities, longer fishing season, etc.

The fishing industry, despite the drastic fluctuation in numbers of fish, appears to be a fairly stable element in the local economy. Technology is changing, but the changes are occurring slowly. Generally, there is a reduction in the number of shore-based canneries and an increase in the number of fast-freeze processing sites to support air freighting salmon to market. There is a slow to moderate growth in the demand for shore-based facilities. The length of the fishing season is changing with the addition of a herring fishery and the potential for bottomfishing in the Bering Sea.

FIGURE 1

BRISTOL BAY BOROUGH UNEMPLOYMENT RATE
BY QUARTER: 1978, 1979, 1980



Source: Alaska Department of Labor, *Labor Force Highlights*

Two major oil and gas lease sales close to Bristol Bay are presently scheduled. They are the St. George Basin sale, scheduled for February of 1983, and the North Aleutian Basin sale, scheduled for April of 1985. Neither sale should have a significant impact on the Bristol Bay Borough. Communities located further south on the Alaska Peninsula have been identified as better able to provide support services to leasable lands. In addition, tidal waters in the Borough are extremely shallow and hamper movement in and out of the port.

A state uplands sale is scheduled for the area around Bristol Bay Borough in September of 1984. Oil and gas potential in these areas is presently estimated as very high. An uplands federal lease sale has also been under consideration. If upland oil and gas lands were to develop, it could create year-round employment opportunity within the Borough. In addition, support services and population would increase in order to accommodate the influx of industry.

Tourism, outdoor recreation and sport hunting and fishing are activities that could expand due to the recent passage of the Alaska National Land Conservation Act. In addition to enlarging Katmai National Park, the following parks and wildlife refuges were established in November of 1980:

- Lake Clark National Park
- Alaska Peninsula National Wildlife Refuge
- Becharof National Wildlife Refuge
- Alaska Maritime National Wildlife Refuge
- Togiak National Wildlife Refuge
- Aniakchak National Park

The Bristol Bay Borough is the logical staging area for serving park and refuge users and presently services many of the 10,000 annual visitors to Katmai. These activities attract visitors six months of the year and could expand seasonal employment opportunities.

Local Development Activity

The following projects are typical of development activity within the Bristol Bay Borough. These projects will provide direct economic benefits to the Borough, particularly during the construction phase. However, many of the projects will be built during the summer months which will coincide with the salmon season, the period of highest employment. Also, the construction may require specialized labor which would be imported from outside the Borough. Construction that begins in the spring and extends into the fall periods on either side of the salmon season could offer additional employment opportunities to the local work force.

Public Dock

A pile-supported, concrete dock is under construction and scheduled to be completed in the fall of 1982. Presently there is no public dock facility in the Borough, and small barges either unload at the cannery docks or are beached for unloading.

The new dock facility will accommodate 200-foot vessels. Two cranes are available, one capable of unloading containers and one smaller crane for unloading break bulk cargo. The channel adjacent to the dock will be dredged to 16 feet below mean low tide, allowing deeper draft vessels to remain afloat at low tide. Approximately 55,000 cubic yards of material

will be dredged from the Naknek River and stockpiled for future use. Road access and a graded staging area will also be constructed as part of the dock facility. The cost of the dock, staging area, and road is $7 million.

Marine Industrial Park

An industrial park is planned adjacent to the public dock facility to support marine cargo handling and storage and encourage industrial development. The complex will contain a warehouse structure and possibly a public works facility. The warehouse will be used for cargo storage and may include cold storage. The marine industrial park is estimated to cost $3 million.

Sewage Disposal System

The U.S. Public Health Service is presently constructing a sewage disposal system in South Naknek that will tie 15 existing homes to the existing system servicing the 11 newly constructed HUD houses. The system will provide primary treatment and pump outfall through a 900-foot buried line into the Naknek River. The construction cost of the South Naknek system is $1,082,000 and the project will be completed in the fall of 1982.

Sewage disposal systems are also planned for Naknek and King Salmon. A $3.5 million system has been designed for Naknek that includes primary and secondary treatment using a sewage lagoon. The project will be partially funded with funds projected to be remaining in 1983.

Solid waste disposal sites are planned for both Naknek/King Salmon and South Naknek. The Naknek/King Salmon site will include a trash compactor and will cost $1.5 million to construct. South Naknek will use an earthfill disposal site with a bearproof fence at the cost of $0.5 million.

Airport Improvement

Improvements are anticipated for both the Naknek airstrip and the King Salmon Airport. Naknek airstrip improvements costing approximately $2 million are presently scheduled for the summer of 1982. Improvements include straightening, gravel resurfacing and improved lighting of the airstrip. In King Salmon, two airport projects are under consideration. An improved surface on the east-west runways is considered necessary by the Air Force in order to better accommodate the high-speed, high-performance aircraft found at the King Salmon installation. Another improvement for the King Salmon airport is the expansion of the east apron. King Salmon, a major regional airport serving the fishing industry, the Air Force and the general public, experiences crowded conditions during the peak of the red salmon run. The expansion of the east apron is expected to partially alleviate this problem. Benefits expected from the projects include increased employment during construction and a better air facility for the area.

Public Facilities

A $4 million addition to the school in Naknek was recently completed and added classrooms and an auditorium to the facility. A fire station was recently completed in South Naknek and provides service to the village; a $200,000 addition to the Naknek fire hall is being planned to support fire protection on the north side of the river.

The Borough intends to broaden its health care responsibility by constructing a 2,500-square-foot health clinic in Naknek. The clinic will include an emergency room, offices, examination rooms, X-ray equipment, and provisions for eye, dental, and medical care.

Industrial and Commercial Development

There is a moderate amount of new industrial and commercial development recently constructed or planned for the Borough fish processing facilities, boat storage, transportation facilities, maintenance yards; lodges and cabins are representative of the type of construction occurring presently. The location of these facilities are logically related to the Naknek River or its tributaries because they service fishing or fish processing.

Residential Development

The Bristol Bay Borough has begun site development for a subdivision located on 800 acres of land overlooking the Naknek River. A community cemetery and residential lots are developed and ready for disposition to individual owners. In addition, the Alaska Peninsula Corporation is discussing the possibility of a subdivision in the South Naknek area and Paug Vik, the

village corporation of Naknek, is planning a 5-acre, 99-year lease program along the rapids section of the Naknek River. Fifteen to 20 single-family residences will have been constructed during 1982, and it is expected that an equal amount of residential units will be constructed during 1983.

RESOURCE INVENTORY FINDINGS

This section summarizes the results of the resource inventory found in Volume I of the Borough's coastal management program, and forms the basis for designating appropriate land and water uses, management policies and the identification of areas which merit special attention. The findings report the essential elements of the resource inventory, and the conclusions suggest areas which need thorough consideration by the Borough as part of its coastal management program.

The Physical Setting

Topography

Finding. The land area within the Borough is relatively flat with over 75 percent below 200-foot elevation. The topography slopes gently from the high elevation of 1,061 feet in the northeast to the coastal bluff along the Naknek River and Kvichak Bay.

Conclusion. The majority of the Borough land has poor surface drainage, which is characterized by standing water and wet or moist tundra. Poor drainage is typical in large areas of relatively flat terrain.

Finding. King Salmon, Naknek and South Naknek are situated at elevations 50, 100, and 75 feet, respectively. Naknek and South Naknek are located on the bluffs above the Naknek River.

Conclusion. The Borough's communities, though protected from tsunami hazards, are threatened by high-energy coastal erosion.

Surface Geology

Finding. The primary surface geological features of the Borough are moraine and glacial drift. Alluvial floodplain and glacial outwash deposits, to a lesser extent, form the low-lying areas.

Conclusion. Moraine and drift deposits are characterized by poor drainage, high ice content and frost-susceptible material. Alluvial and glacial outwash deposits are suitable foundation material, well drained and nonfrost susceptible.

Finding. The coastal bluffs supporting the communities of Naknek and South Naknek are composed of unconsolidated glacial and fluvial deposits. This material tends to be unstable during seismic activity.

Conclusion. The landslide hazard in the developed areas of the Borough is significant and could cause property damage or loss of life.

Seismicity

Finding. The Bristol Bay Borough is north of the major areas of seismic activity. Typically, earthquakes that affect the Borough are at great depths and of low strength.

Conclusion. The earthquake potential within the Borough is low, though the coastal and river bluffs present increased hazards due to their geologic formation and soils.

Volcanism

Finding. Volcanic activity within the Bristol Bay area is extreme. Forty of the sixty volcanic centers have been active over the last three decades.

Conclusion. Ash deposits present the primary hazard related to volcanic activity in the region.

Soils

Finding. The Kvichak and Pustoi soils, identified by the Soil Conservation Service, comprise approximately 41 percent of the Borough's developed land area. Kvichak and Pustoi soils are suitable for highway and building foundation material and are a good source of topsoil and sand.

Conclusion. There is adequate land within the developed area of the Borough to support highway and building construction, and to provide the necessary construction materials.

Finding. The Naknek and Tolsona soils comprise approximately 58 percent of the land within the Borough's developed area. These soils are generally poorly drained with high water content and permafrost. They are poor construction materials due to high frost susceptibility.

Conclusion: Naknek and Tolsona soils should be avoided when possible for construction sites and materials due to potential structural damage and high development costs.

Hydrology

Finding. The Bristol Bay Borough lies within two major watersheds which include the major inland creeks, the Naknek River and Kvichak Bay. These watersheds extend beyond the limits of the coastal management district.

Conclusion. Land and water use within the Borough could impact both local and regional water bodies. Development activity outside the coastal management district could impact resources within the Borough. Cooperative management is necessary to assure adequate protection of Borough resources.

The Natural Setting

Migratory Fish and Wildlife

Finding. Marine mammals, caribou, birds and a variety of fish are migratory and spend a portion of the year in the Bristol Bay Borough. The remainder of the year is spent out of the Borough in other seasonal habitats.

Conclusion. When considering the fish and wildlife resources of the Borough, it is important to understand their migratory nature and the need for a cooperative approach to resource management.

Migration Corridors

Finding. The Kvichak Bay and Naknek River serve as primary migration corridors for a majority of Alaska's salmon.

Conclusion. Salmon migration corridors are essential to the maintenance and enhancement of salmon stocks, and should be protected.

Spawning Areas

Finding. Paul's Creek, King Salmon Creek, and Big Creek are primary spawning and rearing areas for red, king, chum, coho, and pink salmon. The Naknek River, between the communities of King Salmon and the mouth of Naknek Lake, is a primary spawning and rearing area for pink and king salmon and rainbow trout. Naknek Lake and its tributaries are primary spawning and rearing areas for coho salmon.

Conclusion. There are a number of significant salmon and trout rearing areas within the Bristol Bay Borough. These areas should be protected against land and water uses that would adversely impact the species.

Caribou

Finding. The Bristol Bay Borough provides wintering habitat for both the Alaska Peninsula herd and for a small local herd. The Alaska Peninsula herd winters south of Naknek River and the local herd winters north of the river.

Conclusion. The number of caribou wintering within the Borough varies annually, depending upon migration patterns and weather. Caribou is an important subsistence food source for many of the Borough's residents. Wintering habitat should be protected from detrimental land and water uses to maintain and enhance the subsistence resources.

Moose

Finding. Moose range in the riparian habitat associated with Paul's Creek, Smelt Creek and Big Creek during the fall and winter. They calf at high elevations in the northwest portion of the Borough during the spring.

Moose is hunted as a subsistence food source by many of the Borough's residents.

Conclusion. Though the moose population in the Borough is presently stable, disturbance to calving areas or reduced food sources could negatively affect the stock. Moose habitat should be protected from disruptive uses.

Birds

Finding. The Naknek River and the coastal areas along Kvichak Bay serve as primary staging areas for both the fall and spring migration of shorebirds, ducks, geese and swans. In addition, the uplands of the Borough provide nesting grounds for a number of migratory birds.

Conclusion. Staging and nesting areas are essential for maintaining migratory bird populations. Many species of migratory birds are managed under international treaties and provide a subsistence food source for rural Alaskans. Staging and nesting areas should be preserved to maintain present bird populations.

Man's Use

Settlement

Finding. Settlement in the Bristol Bay region occurred over 6,000 years ago. One hunting camp discovered on the Naknek River dates back to 3000 to 4000 B.C.

Conclusion. The Bristol Bay Borough holds a wealth of historic and pre-historic resources. The existing and future sites should be protected as a valuable resource illustrating the community's heritage.

Industrial Land Use

Finding. Fish processing represents the majority of industrial land use within the Borough. There are approximately 20 cannery or salmon processing sites that occupy up to 40 acres each. Four of these sites are abandoned or no longer operative.

Conclusion. Fish processing is a priority land use within the Borough due to its importance to the regional economy. Industrial land should be maintained and future sites reserved to protect and promote economic development.

Commercial and Residential Land Use

Finding. Mixed commercial and residential land use is concentrated within the communities of King Salmon, Naknek and South Naknek. Lower density use is developing along the Naknek-King Salmon Road, with increasing concentration in the vicinity of King Salmon and Paul's Creek.

Conclusion. There are presently 10,000 acres of private and accessible land in and around the communities of King Salmon, Naknek, South Naknek, and along the Naknek-King Salmon Road. The majority of the private land is owned by the Borough's village corporations. Based on demand forecasts for future housing and commercial development, adequate land is available for development over the next 20 years.

Recreational and Subsistence Land Use

Finding. The largest amount of land in the Borough remains in its natural state and is used for recreational purposes and subsistence hunting, trapping, and gathering.

Conclusion. The value of subsistence food sources and recreational pursuits is well documented and contributes to the Borough residents' lifestyles. Adequate land for subsistence and recreational use should be reserved and protected.

Water Use

Finding. The water bodies within the Bristol Bay Borough tend to be more intensively used than the land. Kvichak Bay is used for marine transportation and is a primary commercial fishing area. The Naknek River is used as a marine transportation corridor to service the Borough communities and to supply fish to the canneries and fish processing sites. The river shores are intensively used for subsistence set-netting and sport fishing.

Conclusion. Commercial, subsistence and sport fishing, and transportation access are primary water uses for Kvichak Bay and the Naknek River. These uses should be protected and maintained, and public access to these waterways should be guaranteed.

Population

Finding. The population of the Borough has remained consistent over the past 10 years. Seasonal influx of transient labor increases population to approximately 3,000 people during the salmon season.

Conclusion. The Borough population will increase slightly over the next 10 years based on a low, but constant, growth in the resident fishing industry. Seasonal population expansion will continue to place pressure on the Borough housing market and infrastructure.

Employment

Finding. Commercial fishing and fish processing employ the majority of Borough residents on a seasonal basis. During the 1979 salmon season, Borough fishermen received a gross income of $104.8 million from drift netting, and $16.6 million from set nets.

Conclusion. Commercial fishing is the mainstay in the Borough economy. Priority should be given to those land and water uses necessary to maintain and enhance the fishing industry.

Employment

Finding. Government employment, seasonal construction and subsistence activities also contribute significantly to the Borough economy.

Conclusion. As the Borough grows, employment opportunities will increase proportionately and subsistence use will remain stable.

Land Ownership

Finding. The federal government is the largest landowner in the Bristol Bay Borough, occupying approximately 189,000 acres, or 59 percent of the land area. Paug Vik and the Alaska Peninsula village corporations own a majority of the private land, occupying 40 percent of the Borough. Individual landowners make up a lesser portion of the 129,000 acres in private ownership. The Borough and state governments each own less than one percent, or 3,000 acres of land.

Conclusion. Land ownership in the Borough is varied with large holdings in both private and federal ownership. Village corporations own the surface rights and the Bristol Bay Native Corporation owns the subsurface rights to most of the privately owned land. Future major development activities will depend upon market forces and land and resource availability. The coastal management program should serve as a guide to government and private landowners, by determining appropriate land and water uses and setting policy guidelines.

Land Management

Finding. Land management within the Borough is the responsibility of a variety of federal and state agencies, as well as the Borough government. In addition, the Bristol Bay Cooperative Region has been established to oversee land planning and land and water use decisions on federal and state land.

Conclusion. It is in the best interest of the Borough to complete its coastal management program and work in cooperation with the various levels of government involved in the Bristol Bay region.

HABITAT EVALUATION

Maintaining rich wildlife habitat is very much in the interest of Bristol Bay Borough. Because of its relatively isolated location and cultural heritage, commercial fishing, subsistence hunting and fishing, and, to a lesser extent, recreational hunting and fishing, play an important part in the lives of many residents. In addition to socioeconomic values, recreational and less tangible aesthetic benefits accrue from managing wildlife habitat in a sensitive and ecologically consistent manner.

It is difficult to evaluate the sensitivity of habitats and the effect of development on habitat quality, since impacts are so site- and project-specific. As Bristol Bay Borough continues to grow, losses in types and quality of habitat are unavoidable.

Generally, tundra upland receives the least amount of wildlife use. The Naknek River, major creeks, fresh and saltwater marshes, and associated riparian areas receive the most intense wildlife use. Borough management and residents must assume responsibility for determining the type and degree of habitat disruption from future development permitted by the Borough. Cooperative effort and communication between residents, Borough management, resource managers, government regulators and developers are necessary for a coastal management program to be effective.

In order to effectively evaluate land and water uses and develop management recommendations commensurate with the Alaska Coastal Management Act of 1977, habitats were mapped according to definitions contained in the Alaska Coastal Management Program (ACMP) Standards and Guidelines (6AAC80.900). Definitions of the nine habitat types follow (see Coastal Habitat map):

1. Offshore areas - submerged lands and waters seaward of the coastline.

2. Estuary - a semiclosed coastal body of water which has a free connection with the sea and within which seawater is measurably diluted with fresh water derived from land drainage.

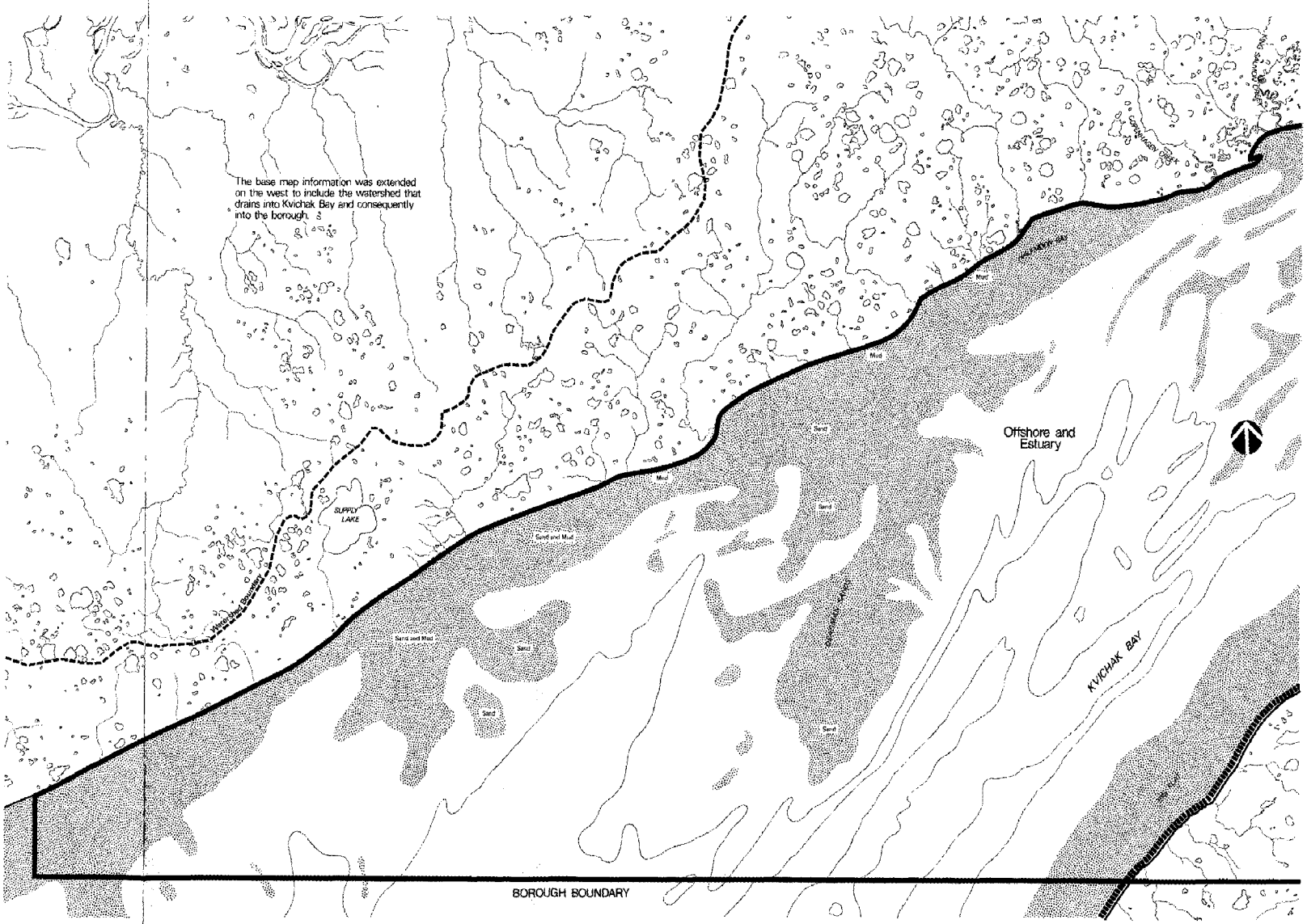
3. Tideflats - mostly unvegetated areas that are alternately exposed and inundated by the falling and rising of the tide.

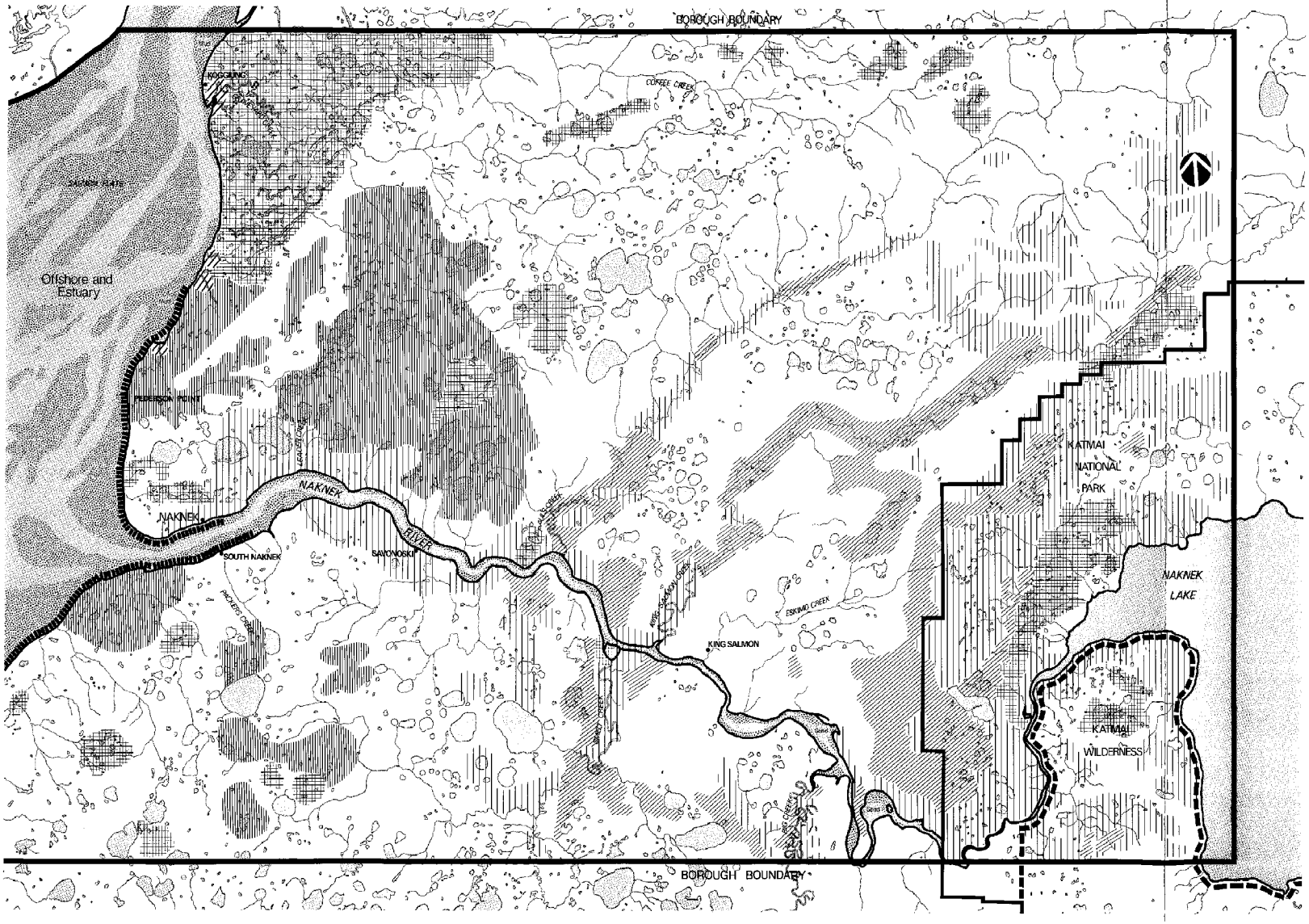
4. Exposed high-energy coasts - open and unprotected sections of coastline with exposure to ocean-generated wave impacts and usually characterized by coarse sand, gravel, boulder beaches, and well-mixed coastal water.

5. Rivers, streams, and lakes - undefined.

6. Upland - drainages, aquifers, and land, the use of which would have a direct and significant impact on coastal water.

7. Wetlands - includes both freshwater and saltwater wetlands; freshwater wetlands are those environments characterized by rooted vegetation which is partially submerged either continuously or periodically by surface fresh water with less than 0.5 part per thousand salt content and not exceeding three meters in depth; saltwater wetlands are those coastal areas along sheltered shorelines characterized by halophytic hydrophytes and macroalgae extending from extreme low tide to an area


The base map information was extended on the west to include the watershed that drains into Kvichak Bay and consequently into the borough.
Offshore and Estuary
SUPPLY LAKE
Mud
Sand
Sand and Mud
KVICHAK BAY
BOROUGH BOUNDARY



Coastal Habitats

LEGEND

Upland

- Lichen Shrub Tundra/Graminoid-Ericaceous Shrub Tundra
- Miscellaneous Deciduous Forest/ Scrub
- Mixed Coniferous-Deciduous Forest

Conditional (Upland/Wetland)

- Graminoid-Ericaceous Shrub Tundra/Mesic Bog

Wetland

- Marsh/Wet Bog/ Wet Meadow
- Tidal Marsh
- Tide Flat
- Streams and Lakes
- Coastal Bluffs

SCALE: miles

0 1 2 3

above extreme high tide which is influenced by sea spray or tidally induced water table changes.

8. Rocky islands and seacliffs - islands of volcanic or tectonic origin with rocky shores and steep faces, offshore rocks, capes, and steep rocky seafronts.

9. Barrier islands and lagoons - depositional coastal environments formed by deposits of sediment offshore or coastal remnants which form a barrier of low-lying islands and bars protecting a saltwater lagoon with free exchange of water to the sea.

Bristol Bay Borough is approximately 500 square miles in area. Only a small portion of this region is accessible by road. Consequently, onsite analysis of most of the area was infeasible. Although a variety of means was employed in delineating habitat, a land cover map developed from digital Landsat and digital topographic data for the Bristol Bay Cooperative Study Region and coded for a range of cover types was the primary source.

Vegetated land cover consists of plant communities. A plant community is an association of plants of different species which are responding to similar environmental conditions such as soil type, moisture, slope, temperature, and aspect. Vegetation communities indicate particular habitat types. Based on a number of variables, but primarily reflectance, plant communities will code as different colors based on digital computerized data.

Habitat types as defined by ACMP are broad, and some of them contain a variety of more specific habitats. For example, uplands include lichen-covered rocky alpine slopes; coniferous, deciduous, and mixed forest; lichen

shrub tundra; and drier types of ericaceous and graminoid shrub tundra. Wetlands cover saline tidal marsh, freshwater marsh and wet bogs and meadows.

Three ranges of cover types characterized the largest portion of terrestrial/wetland portions of Bristol Bay Borough.

- Open low shrub ericaceous/conifer woodland/mesic bog/ericaceous shrub tundra
- Open low shrub graminoid/mesic bog/graminoid shrub tundra
- Lichen shrub tundra

The most difficult task was delineating upland from wetland. For this evaluation, areas color-coded for marsh/very wet bog and wet bog/wet meadow were mapped as wetlands. Where these areas occurred in association with the above three most common cover types, the above types were mapped as wetland. A large area in the northwest section of the Borough was designated as wet on U.S.G.S. topographic map although color coding was ambiguous. Since observation from the air indicated it was extensively wet, it was mapped as wetland.

Uplands were characterized by mixed coniferous-deciduous forest, miscellaneous deciduous forest/scrub and those portions of ericaceous shrub tundra, graminoid shrub tundra and lichen shrub tundra which grew in areas of topographic relief and were probably fairly well drained.

A conditional habitat category was formulated to deal with areas which were difficult to place in an upland or wetland category. These areas were of generally low relief and vegetated with mainly ericaceous or graminoid shrub

tundra. Because of the variety in microrelief, onsite analysis would be required to determine if the area would be considered wetland or upland. Undoubtedly some of the lower areas would be covered with surface water during spring thawing, satisfying the ACMP wetland definition.

Detailed descriptions of different plant associations which actually form specific subhabitats under each broad habitat category are discussed in Viereck, et al (1982). These references should be investigated for a more detailed enumeration of plants and ecological characteristics.

Offshore Areas

Approximately 40 percent of Bristol Bay Borough consists of Kvichak Bay, the northernmost portion of Bristol Bay. The eastern boundary of the Borough follows the western shoreline of Kvichak Bay.

Large tidal ranges prevent the formation of shorefrost ice during winter months. Tidal ranges increase toward the head of the bay; in Naknek, the mean tidal range is 18.5 feet.

Much of Kvichak Bay is relatively shallow with large tide flats, exposed at low tides. The long fetch to the southwest and the relative shallowness of the water cause steep, irregular waves, rather than long swells.

Water quality in Kvichak Bay is good with excellent flushing because of the large tidal ranges and large flows from the rivers. Turbidity varies but can be high because of the shallow bay, large waves, and spring melt waters.

Kvichak Bay abounds in wildlife on a seasonal basis. All five species of Pacific salmon migrate through the coastal waters to the Kvichak and Naknek

Rivers for spawning. Walrus, seal, and whale migrate through Bristol Bay proper and occasionally can be found in Kvichak Bay. Whistling swans, sandhill cranes, numerous species of ducks and shorebirds, and several species of geese all rest and feed at times in the shallow water of the bay.

Estuary

Because of the freshwater influence of the Kvichak and Naknek Rivers, and general coastal drainage, the waters of Kvichak Bay are considered estuarine with salinity ranging from 12.4 to 31.2 parts per thousand. Because of the higher water flows from the drainages during spring and early summer, salinity tends to be less at those times. In addition, a saline wedge of water protrudes up both the Kvichak and Naknek Rivers creating estuarine conditions in their lower sections. In the Naknek River, salinities of up to 10 parts per thousand have regularly been detected eight miles up from the mouth and may extend several miles past this point during a combination of high tide and low river flow (Buck, et al., 1978).

Estuarine ecosystems are characteristically highly productive when compared to most terrestrial or open water areas. River and streams supply terrestrially derived nutrients and deep and cold oceanic waters contribute marine nutrients to relatively shallow basins which result in high primary production capable of supporting a high diversity of wildlife.

Tideflats

Tideflats occur throughout Kvichak Bay and approximately four miles up the Naknek River. Tideflats occurring in Kvichak Bay and the estuarine portion of Naknek River are strongly influenced by the saline character of the water and are mainly unvegetated.

Tides also cause fresh water upriver of the estuarine areas of the Naknek River to rise and fall uncovering sand, mud, or silt substrate. These periodically wetted lands are also mainly unvegetated.

Both the Fish Wildlife Service (FWS) and Corps of Engineers (COE) consider tideflats as wetlands and the COE maintains permit authority over alteration to these habitats.

Exposed High-Energy Coasts

North of the Naknek River, coastal bluffs consisting of glacial drift and fluvial deposits occur upriver of the town of Naknek, around Cape Suworof, and up the coast approximately three miles. South of the Naknek River, coastal bluffs occur from upriver of South Naknek, west toward the mouth of the river, and south down the coast past the southern Borough boundary line. Riverine bluffs also occur up the Naknek River on the north and south side of the river. Generally, these bluffs are highest at Naknek and South Naknek where they reach 75 to 100 feet in height. Upriver and around the mouth of the river to the north and south, bluffs vary between 25 and 75 feet high.

The steep sides of the bluffs are generally unvegetated consisting of unconsolidated materials. Deciduous thickets of Kenai birch, Sitka alder, and willow occur along the top of the bluffs.

Rivers, Streams, and Lakes

The Bristol Bay Borough lies within two major watersheds. They are the Naknek lake and river system and the Kvichak Bay or coastal watershed. The Naknek lake and river system is the most significant hydrologic feature within the Borough. Feeding the Naknek River are four major tributaries with drainages that form a major portion of the Borough. The major tributaries are King Salmon Creek, Paul's Creek, Smelt Creek, and Big Creek. In addition, there are numerous surface-fed streams that run into Naknek Lake and Naknek River.

Land adjacent to rivers and creeks consisting of relatively flat floodplains and steeper terrain leading up to relatively level tundra or deciduous forests is termed "riparian." Grasses, primarily bluejoint and sedges, are common along with herbaceous plants such as bunchberry, fireweed, yarrow, northern water carpet, northern rockcress, cloudberry, nagoon-berry, and violets. Kenai birch, willow, and alder comprise a tall shrub or tree layer depending on where they grow. Frequently on the low, active floodplain areas, dense thickets of these trees occur.

On the edge of the streams and rooted in the water, marsh fivefinger and sedges predominate. Water buttercup and mare's tail occur as submerged aquatics. A linear-leaved potamogeton, probably Potamogeton vaginatus, grows in the Naknek River along with other aquatic plants.

Lakes and ponds of varying sizes and depths occur throughout the Borough. Many of the shallower ponds are constantly filling with decayed plant material and sediment as they change to marshes and wet meadows. A number of ponds on the 1951 U.S.G.S. topographic maps appeared as marshy areas on the 1981 Landsat photographs.

Emergent aquatic plants such as sedges, marsh fivefinger, swamp horsetail, and buckbean grow in the shallow margins of the lakes. Occasionally, yellow pond lily, a floating aquatic plant, will cover a portion of a pond.

Although described under "rivers, streams, and lakes" in this analysis, the FWS and COE consider active floodplains along riparian areas and lakes and ponds with depths less than 6.6 feet as wetlands for permitting purposes.

The Naknek River and Paul's and King Salmon Creeks are excellent fish habitat. Salmon hatch, rear, migrate, and spawn in these waters. In addition, rainbow trout, grayling, Dolly Varden, and whitefish and several nongame species of fish, including sculpin and stickleback, reside year-round in these waters. The stretch of river above Rapids Camp is especially noted for rainbow trout fishing.

Naknek Lake and a number of other smaller lakes are also noted for fishing. Northern pike, rainbow trout, lake trout, and Arctic char are the main species in these lakes.

Riparian areas up and down the major creeks and along the Naknek River provide excellent habitat for a number of larger mammals including brown and black bears, moose, beaver, mink, otter, muskrat, lynx, red fox, and wolf. These animals venture out on the flat tundra vegetation, mainly to feed.

Whistling swans and numerous species of waterfowl nest and stage along the creeks and lakes. The area along the lower sections of Big Creek is a noted swan staging area.

Uplands

A number of distinct plant communities characterize upland habitats in Bristol Bay Borough depending on environmental factors such as soil type, slope, aspect, and evaluation.

Mixed Coniferous-Deciduous Forest

This habitat type generally occurs on moderate to moderately well drained soil and parallels much of the higher ground along the lower portion of Paul's Creek, most of King Salmon Creek, and along a shelf running north-south in the eastern portion of the study area. Coniferous species are limited to white and black spruce. Kenai birch dominates the deciduous upper story. The shrub layer consists of dwarf birch and scattered shrub willows. Crowberry, narrow leaf Labrador tea, alpine azalea, moss, and grasses cover the ground.

Miscellaneous Deciduous Forest/Scrub

This habitat characterizes well-drained soils in the Kvichak and Pustoi series frequently occurring in riparian areas on floodplains and also on higher ground along the Naknek River and raised areas scattered about the tundra. The lower areas located on active floodplains, which would experience flooding yearly or every several years, are considered wetland. Trees include Kenai birch, Sitka alder, and willow. Usually in mature stands, there is an open canopy and all these species are present in varying proportions. Associated shrubs include blueberry, dwarf birch, and willow. Fireweed, yarrow, roseroot, bunchberry, nonsphagnum type mosses, and grasses comprise a few of the groundcover species.

Lichen Shrub Tundra

The lack of trees and tall shrubs and the dominance of lichen and low ericaceous (heath) and dwarf shrubs are the most characteristic aspects of this relatively drier and well-drained habitat. Herbaceous nongraminoid plants are poorly represented. Crowberry, alpine bearberry, Labrador tea, blueberry, and dwarf birch comprise a low shrub community. Groundcover consists of mostly lichen, moss, and sedge.

Wetlands

The importance of wetlands to the ecology of a region is well-documented. Wetlands provide buffers from storms and flooding by absorbing excess water into the organic matrix which serves as substrate. Wetlands serve as hydrological reserves where they slowly release stored water to ground and surface water reservoirs which is especially needed during times of drought.

Wetlands can also filter out pollutants, such as suspended solid material, as water flows through the vegetation and organic matrix. Wetlands supply nutrients to marine and aquatic habitats thereby enhancing productivity and serving as habitat, nursery grounds, and food sources for a large variety of plants and animals.

Wetlands are defined in a variety of ways depending on who is defining and what purpose the definition serves. There are many different types of wetlands and, because the difference between upland and wetland lies on a continuum, there is no one indisputable ecologically sound definition.

The FWS defines wetlands as "lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year" (Cowardin, et al., 1979).

For the COE, plant communities mainly determine wetlands. COE regulations designate wetlands as ". . . those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." (33 CFR 323.2(c).)

The Alaska Coastal Management Program (ACMP) Standards and Guidelines emphasize surface water in defining freshwater wetlands. As previously

cited, wetlands "include both freshwater and saltwater wetlands; freshwater wetlands are those environments characterized by rooted vegetation which is partially submerged either continuously or periodically by surface fresh water with less than 0.5 part per thousand salt content and not exceeding three meters in depth; saltwater wetlands are those coastal areas along sheltered shorelines characterized by halophytic hydrophytes and macroalgae extending from extreme low tide to an area above extreme high tide which is influenced by sea spray or tidally induced water table changes." For this habitat analysis, the ACMP definition was utilized.

The COE considers wetlands as under their jurisdictional authority based on Section 404 of the Clean Water Act. Consequently, active floodplains considered in this study under "miscellaneous deciduous forest scrub" and large areas of the Borough which are considered conditional upland/wetland for this analysis because of the ACMP definition and its emphasis on submergence by surface water would be considered wetland by the COE.

Freshwater Marsh

Fresh standing water, occasionally obscured by vegetation, supports plants which generally only occur in this type of mostly aquatic habitat. Buckbean, marsh fivefinger, and swamp horsetail are dominant forbs; sedges also occur in thick stands.

Wetbog - Meadow

These very wet habitats support a moderate diversity of plants with mosses and sedges predominating. Shallow standing water occurs in pools and wet barren soil is scattered throughout the habitat, but very little vegetation grows in these areas. Mounds characterize the microrelief vegetated with bog rosemary, dwarf birch, and blueberry.

Tidal Marsh

Tidal marshes occur throughout most of the low areas along Kvichak Bay, and they extend inland along some of the creeks which drain the lowlands. Much of the ground is barren and covered with water at higher tides. Vegetation consists of plants which can tolerate tidal fluctuations and saline water. Sedges, mainly Carex Lyngbye and cottongrass, comprise most of the vegetation.

Conditional Upland/Wetland

These habitats include tundra vegetation and probably correspond to areas Viereck and Little (1972) mapped as wet tundra. Along with the definite marsh and wet bog and meadow areas, Landsat revealed two main habitat types: ericaceous shrub tundra and graminoid shrub tundra. These occur on both poorly drained and moderately well drained soils.

Visits to a number of these sites during mid-June 1982 showed relatively dry areas with a minimum of standing water and cottongrass tussocks as the dominant vegetation. Below the surface layers of vegetation, soil was damp.

None of the vegetation was actually submerged. Small pothole like depressions were present and contained wet soil or shallow water with no vegetation. Conceivably during spring thaw, some of the lower areas and portions of the plants are under standing water for periods of time.

Ericaceous Shrub Tundra

This plant community has little structural diversity. Ericaceous shrubs such as Labrador tea, bog rosemary, alpine azalea, dwarf birch, and low willow comprise the very low shrub layer. The ground layer consists of mat willows, cloudberry, grasses, and sedges, primarily cottongrass.

Graminoid Shrub Tundra

This species composition resembles ericaceous shrub tundra, but with grasses and sedges, mainly cottongrass, occurring more abundantly.

Rocky Islands, Sea Cliffs, Barrier Islands, and Lagoons

These features do not occur in Bristol Bay Borough.

Sources

In mapping and analyzing Bristol Bay coastal habitats, the following information sources were utilized:

- Site visits
- Aerial reconnaissance
- U.S.G.S. topographic maps and overlays (1:63,360 or 1 inch = 1 mile)

- Aerial photographs (1 inch = 1,000 feet)
- Satellite information (Landsat) - geometrically corrected, scaled photographs and computer data coding land cover types
- Bristol Bay Land Cover Map Users Guide (draft)

CHAPTER FOUR

THE MANAGEMENT FRAMEWORK

The management framework chapter of this report focuses on the following topics required by the standards and guidelines:

- Uses - those land and water activities considered in the Borough's program.
- Policies - statements that guide development and land and water uses within the Borough.
- Areas which merit special attention (AMSA) - those areas with unique and valuable resources needing special management attention.

LAND AND WATER USES

The following land and water activities and uses are subject to the Bristol Bay Borough Coastal Management Program.

- Coastal development - residential, commercial, and industrial
- Recreation - land and water areas
- Energy facilities - oil and gas exploration, processing, and transport; electric and hydroelectric facilities; and transmission lines
- Transportation - highway, air, and marine facilities
- Utilities - water and sewer lines and facilities, wells and treatment sites, solid waste disposal

- o Fisheries - seafood processing, fisheries enhancement and rehabilitation.

- o Mining and mineral processing - hard rock mining; gravel, sand, and related extraction

- o Subsistence - areas and activities

USES OF STATE CONCERN

The Bristol Bay Coastal Management Program addresses uses of state concern through its policies and implementation strategy. Uses of state concern, meaning those lands and water uses which significantly affect the long-term public interest, are outlined and defined according to the following five categories:

1. Uses of national interest, such as the use of resources for the siting of ports and major facilities which contribute to meeting national energy needs, construction and maintenance of navigational facilities and systems, resource development of federal land, and national defense and related security facilities that are dependent upon coastal locations.

2. Uses of more than local concern, such as land and water uses which confer significant environmental, social, cultural, or economic benefits or burdens beyond a single coastal resource district.

3. Siting of major energy facilities, activities pursuant to a state oil and gas lease, or large-scale industrial or commercial development activities which are dependent on a coastal location and which, because

of their magnitude or the magnitude of their effect on the economy of the state or the surrounding area, are reasonably likely to present issues of more than local significance.

4. Facilities serving statewide or interregional transportation and communication needs.

5. Uses in areas established as state parks or recreational areas under AS 41.20 or as state game refuges, game sanctuaries, or critical habitat areas under AS 16.20.

Appendix V of the resource inventory lists and describes fisheries research and management sites nominated by the Department of Fish and Game as supporting uses of state concern. The uses are salmon enumeration and sampling sites located within the Naknek River drainage.

PROPER AND IMPROPER USES

It is the Bristol Bay Borough's intent to evaluate and to make decisions upon the appropriateness of land and water uses and activities on a case-by-case basis. Proposed uses will be measured according to the performance standards stated in the policy section of this report. The standards will be applied with due consideration to the resource inventory and analysis. A discussion of the review process is included in the implementation chapter of this report.

MANAGEMENT POLICIES

The following policies are to be used to guide the Bristol Bay Borough Planning Commission and Assembly in determining proper and improper use and the acceptability of proposed plans and projects within the coastal district.

The management policy section is divided into two areas: (1) general policies applicable to all activities and uses, and (2) management guidelines and policies specific to the various habitats found in the Bristol Bay Borough.

NOTE: Each of the following policies is to be preceded by the phrase, "where feasible and prudent." Feasible and prudent means consistent with sound engineering practice and not resulting in economic, social, or environmental problems that outweigh the public benefit to be derived from strict compliance with the policy.

General Policies

1. When planning for and approving waterfront development, priority shall be given in the following order to:

   - o Water-dependent uses and activities
   - o Water-related uses and activities
   - o Uses and activities which are neither water-dependent nor water-related for which there is no feasible and prudent inland alternative to meet the public need for the use or activity.

2. High priority shall be given to maintaining and, where appropriate, increasing public access to coastal water.

3. Transportation and utility routes and facilities must be sited inland from beaches and shorelines unless the route or facility is water-dependent or no inland alternative exists to meet the public need for the route or facility.

4. Maintenance and enhancement of fisheries shall be given priority consideration in reviewing proposals which might adversely impact fisheries habitat, migratory routes and harvest of fish or shellfish species. Alternate designs shall be seriously considered for such proposals, if such potential adverse impacts are significant. Shorelines having banks, beaches, and beds critical to the fisheries resource base shall be maintained in a productive natural condition.

5. Multiple use of the shoreline shall be encouraged where new uses or activities do not interfere with priority uses. Uses or activities which will interfere with the fishing industry shall be located in geographically separate areas.

6. Permitted development and activities shall not significantly degrade the quality of the natural environment, nor contribute to erosion or other deleterious effects on adjacent land.

7. Recreational and visual access to coastal areas shall be provided where consistent with public safety and private property rights.

8. Implementation of governmental services and facilities for public purpose shall be in conformance with applicable plans, policies, and programs of the Bristol Bay Borough.

9. Permitting activities or uses in the Bristol Bay Borough shall be contingent upon conformance with all applicable federal and state regulations.

10. Subsistence use, where predominant within the publicly owned areas of the coastal zone, shall be given primary consideration in determining resource allocations.

Specific Management Guidelines and Policies

1. Offshore and Estuarine Areas

Guidelines: As an offshore area Kvichak Bay "must be managed as a fisheries conservation zone so as to maintain or enhance the state's sport, commercial, and subsistence fishery."

As an estuary, Kvichak Bay and the lower 10 miles of the Naknek River "must be managed so as to assure adequate waterflow, natural circulation patterns, nutrients, and oxygen levels, and avoid the discharge of toxic wastes, silt, and destruction of productive habitat."

Policies:

1.1 In conformance with AS 38.05.140, "the submerged and shore lands lying north of 57 degrees, 30 minutes north latitude and east of 159 degrees, 49 minutes west longitude within the Bristol Bay drainage are designated as the Bristol Bay Fisheries Reserve. Within the Bristol Bay

Fisheries Reserve, no surface entry permit to develop an oil or gas lease may be issued on state-owned or controlled land until the legislature specifically finds that the entry will not constitute danger to the fishery. All of Kvichak Bay located in the Bristol Bay Borough in the Bristol Bay Fisheries Reserve.

1.2 Development in or over water, such as piers, docks, and protective structures shall be located, designed, and maintained in a manner which prevents decreases in water quality and disruptions to fish and other wildlife habitat.

1.3 Open pile or pier support structures shall be used in lieu of filled areas for piers or docks which project into the water.

1.4 Dredging and filling shall be permitted only where it is essential to the activity or use proposed. Areas which will require frequent or periodic maintenance dredging are less preferred than self-maintaining channels or basins.

1.5 Dredging for the sole purpose of obtaining materials for landfill or construction shall not be permitted.

1.6 Dredging or pile-driving activities shall be conducted in a manner that minimizes pollution to marine water. Dredging or pile-driving activities will be timed in coordination with the Department of Fish and Game so that they interfere as little as possible with migrating salmon.

1.7 Permitted activities or uses in or over the water shall be contingent upon conformance with all applicable federal and state regulations.

2. Exposed High-Energy Coasts

Guideline: "High-energy coasts must be managed by assuring the adequate mix and transport of sediments and nutrients and avoiding redirection of transport processes and wave energy."

Policies:

2.1 Open pile or pier support structures shall be used in lieu of filled areas for piers or docks which project into the water.

2.2 Dredging for the sole purpose of obtaining materials for landfill or construction shall not be permitted.

2.3 Development along the coastal bluff shall be set back in accordance with all applicable federal and state regulations.

3. Important Upland Habitat

Guideline: Uplands "must be managed so as to maintain or enhance the biological physical and chemical characteristics of the habitat which contribute to its capacity to support living resources."

Policies:

3.1 Clearing and grading operations shall be conducted so as to minimize soil erosion. Erosion control measures shall be undertaken from the beginning of clearing. Vegetation shall be restored or control measures instituted at the earliest possible date. The Soil Conservation Service should be consulted for techniques and plants which are

most appropriate. All clearing and grading near to or involving flowing water courses shall be conducted in such a fashion so as to minimize material entering the water. Runoff through construction areas shall be controlled from beginning to end of project.

3.2 Off right-of-way traffic and vegetation disturbance shall be minimized in all projects. All clearing and grubbing activity shall be in coordination with the present season construction schedule.

3.3 To the greatest extent possible, avoid disrupting the organic mat in permafrost areas and the vegetation along cut banks.

3.4 Upland borrow sites shall be restored with topsoil and revegetated.

3.5 Local Fish and Game biologists shall be consulted in the initial planning phases for the routing of roads, pipelines, and transmission lines, so that such prime wildlife habitat as moose calfing and riparian areas and marshes can be avoided.

3.6 Highways and residential and secondary roads shall be constructed using (overlay) methods. Roads should not be routed through marshes or wet bogs and meadows, and drainage patterns should be maintained.

3.7 Both caribou and moose calve from May 20 through June 8 and general ranges are mapped in the resource inventory. Construction activities through these areas shall be avoided during this critical period.

4. Wetlands and Tideflats

Guideline: "Wetlands and tideflats must be managed so as to assure adequate water flow, nutrients, and oxygen levels and avoid adverse effects on natural drainage patterns, the destruction of important habitat, and the discharge of toxic substances."

Policies:

4.1 Dredging and filling shall not be permitted where valuable wetlands or tideflats would suffer significant harm.

4.2 Disposal of dredge material shall be in upland areas; except where dredge spoil may be utilized in shoreside landfills, if permitted under applicable regulations.

4.3 Roads and pipeline pads shall not be constructed through freshwater or tidal marshes, since drainage patterns would be altered.

4.4 The local Department of Fish and Game and all appropriate federal and state agencies shall be consulted when routing roads and utility corridors, so that prime wildlife habitat such as marshes and riparian areas and seasonally critical habitat such as moose calfing areas can be avoided.

5. Rivers, Streams, and Lakes

Guideline: "Rivers, streams, and lakes must be managed to protect natural vegetation, water quality, important fish or wildlife habitat, and natural water flow."

Policies:

5.1 Development in or over water, such as piers, docks, and protective structures shall be located, designed, and maintained in a manner which prevents decreases in water quality and disruptions to fish and other wildlife habitat.

5.2 Open pile or pier support structures shall be used instead of filled areas for piers or docks which project into the water.

5.3 Dredging and filling shall be permitted only where it is essential to the activity or use proposed. Areas which will require frequent or periodic maintenance dredging are less preferred than self-maintaining channels or basins.

5.4 Dredging for the sole purpose of obtaining gravel or materials for landfill or construction shall not be permitted.

5.5 Dredging or pile-driving activities shall be conducted in a manner that minimizes pollution to marine water. Dredging or pile-driving activities will be timed in coordination with the Department of Fish and Game so that they interfere as little as possible with migrating salmonids.

5.6 Permitted activities or uses in or over the water shall be contingent upon conformance with all applicable federal and state regulations.

5.7 Pipelines and roads which cross streams shall be minimized and grouped in one area to lessen the number of areas where any one drainage has to be crossed.

5.8 Bridges shall be used to cross streams whenever feasible, so that the natural character of a stream bed will not be disrupted. Culverts are usually unable to carry the high flows from winter runoff unless greatly oversized and can cause blockage to fish passage. The Alaska Department of Fish and Game have developed installation standards for culverts which should be followed when their installation is a necessity (Appendix 1). For temporary right-of-ways, consideration should be given to removing culverts at project completion.

5.9 Facilities for storing and distributing fuel shall not be located within the floodplain of a fish-bearing stream.

5.10 A 1,500-foot buffer zone shall be required to separate adjacent sewage ponds and oil storage facilities from freshwater supplies and fish-bearing streams. Exceptions may be made where impermeable berms would be able to contain the spread of sewage or oil.

5.11 Coordination shall be established with the local office of Fish and Game and appropriate federal and state agencies before any activity in a water body, including the Naknek River, streams, and lakes, is undertaken. A number of activities cause less damage when undertaken during certain periods of the year as prescribed by the Department of Fish and Game. Salmon fry and smolts migrate into the Naknek River estuary between May 10 and June 30. Adult fish migrate upriver and spawn from June 15 through October 15.

5.12 Water intake pipes shall be designed with screens of sufficient size that fry and juvenile fish are not entrained or impinged upon the screen. Maximum water velocity at the surface of the screen should be

less than 0.1 foot per second. Screen openings shall not be larger than 0.04 inch (1 millimeter). Where other techniques achieve similar results or in water where no young fish are present, exceptions can be granted.

5.13 Extraction of floodplain gravel from the Naknek River and streams in the Borough shall not be permitted because of bluff instability and disruption of fishery habitat. Preferred sources for gravel are: (1) existing gravel pits, (2) reuse of gravel from abandoned areas, (3) new upland pits; (4) dredging of nonfish-bearing lakes; and (5) approved offshore gravel sources.

5.14 Refuse disposal sites shall not be located within floodplains - prime wildlife habitat, or where it could pollute groundwater.

5.15 To preserve stream bank and channel integrity, new construction or land clearing shall set back from the water's edge in accordance with all applicable state and federal regulations.

CHAPTER FIVE

IMPLEMENTATION PROCESS

The Bristol Bay Borough is a small, remote, local government that exercises its regulatory authority on a modest scale. For a district coastal management program to work effectively and efficiently, it must be tailored to meet the regulatory needs and the administrative capabilities of the local government. The challenge, as outlined in the legislative policy forming the Alaska Coastal Management Act, is to develop an implementation scheme, that, to the maximum extent possible, uses existing Borough, state and federal regulations and does not unnecessarily require more government or more regulations.

REGULATORY AUTHORITY

The coastal management policies described in 6 AAC 85.090 and detailed in Chapter IV are the foundation of the Borough's program. They are the enforceable rules used to determine proper and improper land and water uses and used to guide coastal development within the district. In addition to the management policies, the following borough ordinances are also used to implement the Coastal Management Program.

- Title 20, Bristol Bay Borough zoning code
- Title 18, Bristol Bay Borough subdivision regulations
- Title 20, building permit process

The Bristol Bay Borough Coastal Management Program should be adopted by ordinance as part of the Borough's land use regulations.

The district's enforceable policies and land use regulations are to be combined with existing state and federal regulatory authority for the purpose of adding broader authority to the program. Integrating and strengthening the district program with local state and federal regulations also establishes a common decision-making process for determining consistency.

FEDERAL-REGULATED OR INITIATED ACTIVITIES

The Division of Policy Developmental and Planning, Office of the Governor is responsible for determining consistency for federal actions. The Bristol Bay Borough will review all federal actions and will make recommendations regarding the project's consistency with the district program.

STATE-REGULATED OR INITIATED ACTIVITIES

The Bristol Bay Borough has selected the following state activities and permits for receiving notification prior to an agency decision.

- Anadromous fish protection, Alaska Department of Fish and Game AS 16.05.870.
- Land selection, leases (including minerals), classification or land disposals issued by the State Department of Natural Resources AS 38.05.045-.110, AS 38.05.181, AS 38.05.150, AS 38.05.185-.280, AS 38.05.180, AS 38.05.035, AS 38.05.345.

- Designation of any "critical habitat" under AS 16.20.220-270 by ADFG.

- Designation, expansion, or deletion of any state or federal land holdings within or adjacent to Borough receiving special management attention (e.g., refuges, parks, sanctuaries, national monuments, and scenic rivers).

- State Department of Environmental Conservation water quality standards - certificate of reasonable assurance (AS 46.03.010-.750, 18AAC70).

- Solid waste disposal.

- Section 404 of the federal Clean Water Act and federal Section 10 of Rivers and Harbors Act permits issued by Corps of Engineers.

- Construction of public facilities and projects.

Written recommendations on the project's consistency will be forwarded to the agency in a timely manner (minimum 30 days) and "great weight" shall be given to the views of the district.

LOCAL-REGULATED AND INITIATED ACTIVITIES

The Bristol Bay Borough provides both routine approval and formal review on local uses and activities depending on the type and the scale of the project. For the most part, building permits, zoning changes, and plat approvals for individual residences require routine administrative review. Formal review is required for the following situations:

- All federal and state consistency determination recommendations requiring "great weight" consideration.
- All major activities needing only local approval as determined necessary by the Borough Planning Commission.
- All activities which involve a performance standard established by a management policy.

REVIEW PROCESS

The simple review process which follows will determine the need for administrative review, formal analysis and written consistency determinations for proposed projects or actions. The process should allow the zoning administrator or building permit official to review projects concurrently with their existing review responsibility.

1. Using the included checklist, review the project for consistency with the local program.
2. If the project or activity is consistent, write consistent or approved on line 8. The district may want to encourage the state and federal government in their determination. This can be accomplished by outlining the positive aspects of the project along with the consistency determination.

3. If the project or activity is not consistent, state the portions of the program affected and recommended remedial action. The comments should include, at a minimum:

   - o Specific remedial action
   - o Rationale for requesting action
   - o Binding provisions of the district program, cite by policy, ordinance, etc.

4. The review should be completed within 30 days.

FIELD CHECKING AND ENFORCEMENT

Periodic checking of major projects and routine field inspections will be conducted concurrently with the administration of zoning, regulating subdivisions and issuing building permits. If projects or activities are found in violation of the program, the district will use local, state and federal enforcement to correct the situation. Enforcement will depend upon the nature and jurisdiction of the violation.

The Bristol Bay Borough Planning Commission and Planning Staff are responsible for receiving and processing local, state and federal consistency determination recommendations. The staff is also responsible for checking, enforcement and overall program management and coordination. The Borough Planning Commission is advisory to the Borough Assembly. All final decisions will be approved by the assembly when a formal written analysis for a consistency determination is required.

BRISTOL BAY BOROUGH

COASTAL MANAGEMENT PROGRAM

CONSISTENCY CHECKLIST

1. Project description _____

2. Level of government _____

3. General effects upon coastal area and resources _____

_____

4. Uses, activities, resources and habitats that will be significantly affected:

____ a. Offshore and estuaries ____ d. Wetlands and tideflats

____ b. Exposed high-energy coasts ____ e. Rivers, streams and lakes

____ c. Uplands habitat

5. Area which merits special attention affected _____

_____

6. Does project or activity require written response _____

7. Is the action consistent with:

a. Local land and water use controls _____

b. Goals and objectives _____

c. Management policies _____

d. Areas which merit special attention _____

8. What action is necessary to make project or activity consistent

_____

_____

_____

_____

Date _____ Signed _____

AREAS WHICH MERIT SPECIAL ATTENTION

"Areas which merit special attention" (AMSA) is a designation created by the Alaska Coastal Management Act for geographic areas requiring special management. To receive this special consideration, an area must be one of the following:

- Unique, fragile natural habitat, of cultural value, of historical significance or scenic importance
- Of substantial recreational value
- Where development of facilities is dependent upon the utilization of, or access to, coastal waters
- Susceptible to industrial or commercial development
- A significant hazard
- Needed to protect, maintain, or replenish coastal land or resources, including coastal floodplains, aquifer recharge areas, beaches, and offshore sand deposits.

In the Bristol Bay Borough, there are three such geographic areas requiring special consideration (see Areas Which Merit Special Attention map). It is recommended that these areas be designated areas which merit special attention. A management plan should be developed for each area that allows both planned development to occur, while protecting the natural, physical, and man-made resources.

AMSA A: Marine Industrial Park

This area surrounds the newly constructed public dock facility located between the Naknek-King Salmon Road and the Naknek River. It is recommended as an AMSA because of the proposed port facilities and industrial park developing adjacent to the Naknek River, a critical salmon migration corridor. The area includes the Naknek River bluffs which are both hazardous and have a high erosion potential.

Selection Criteria

AMSA A is an industrial area adjacent to an important salmon migration and rearing area. Potential hazards include land slides, storm surges, erosion, and accidental petroleum spills.

Area Description

The area in and around the newly constructed public dock is included along with the Naknek River coastline and uplands.

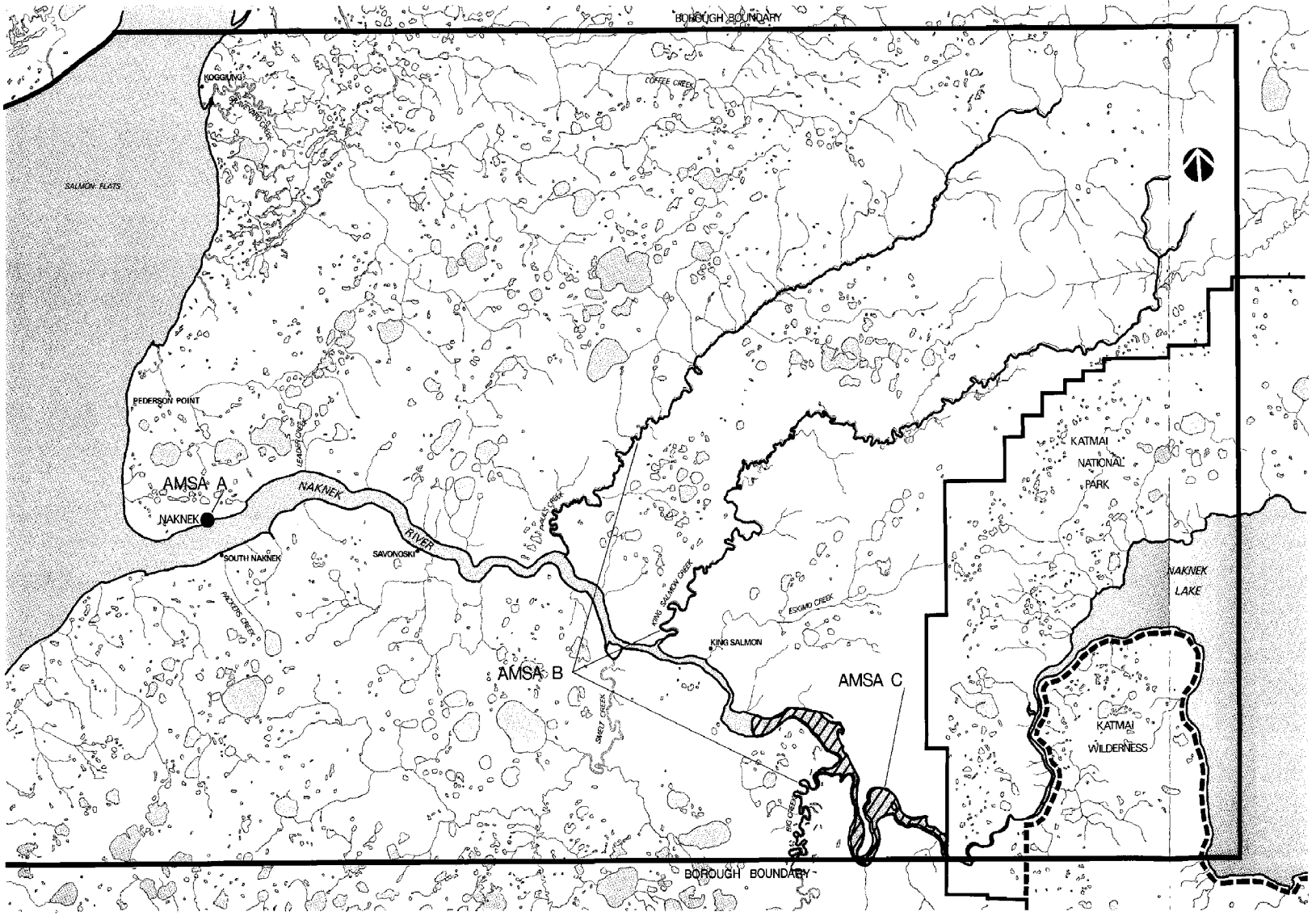
Status of Area

The area includes both private and public ownership and has mixed residential use surrounding the proposed marine industrial park. The Bristol Bay Borough owns the public dock and has planning and zoning responsibility for the area.

Status of Adjacent Area

The ownership management jurisdiction and use are similar to that within the AMSA.

Areas Which Merit Special Attention



Management Objectives

The management objective for this AMSA is to protect the salmon migration and rearing areas in the Naknek River and to allow the marine industrial park to develop while minimizing resource conflicts and natural hazards.

AMSA B: PAUL'S CREEK/KING SALMON CREEK AREA

This area includes both Paul's Creek and King Salmon Creek. The reason for the designation is the potential conflict between development along the Naknek-King Salmon Road and adjoining areas and two highly productive salmon spawning creeks.

Selection Criteria

AMSA B is an area of high natural productivity and of essential habitat for wildlife, especially salmon, trout, bear, and moose.

Area Description

The area includes the upland and floodplain around Paul's Creek and King Salmon Creek. It extends from approximately 1/2 mile west of Paul's Creek to 1/2 mile east of King Salmon Creek, and from the Naknek River, 4 miles north to the rolling uplands. The area includes the intersection of the Naknek-King Salmon Highway and two of the Borough's most important salmon spawning creeks.

Status of Area

The area is primarily privately owned by individuals and is under the planning and zoning jurisdiction of the Bristol Bay Borough. Low density residential and commercial use presently exists within the area. Paul's

Creek and King Salmon Creek serve as marine access routes and moorages to a limited degree.

Status of Adjacent Area

The ownership, management, jurisdiction, and use are similar to that within the AMSA.

Potential Conflicts

The uplands along Paul's Creek and King Salmon Creek are developable areas. They are privately owned with easy access and are surrounded by a pleasant natural setting. Presently, a number of residences and businesses are located in the area and indications are that this trend will continue. As development occurs, the potential for disturbance and destruction to watersheds will increase. Poor construction practices causing erosion, dredging and filling, and toxic waste spillage are examples of the potential hazards. A management plan developed to accommodate special considerations in this area could promote appropriate development and still protect the Borough's valuable resources.

Management Objective

The management objective for this area is to promote planned development of a type and scale that protects the salmon migration corridor and spawning beds. Proper and improper uses would be determined, design guidelines established, and a regulatory process recommended as part of the management scheme.

ASMA C: BIG CREEK AND RAPIDS SECTION OF THE NAKNEK RIVER

This area includes the Big Creek and rapids section of the Naknek River. The reason for the designation is the high spawning concentration of king, coho, pink, and chum salmon and rainbow trout in an area that is privately owned and being leased for residential development.

Selection Criteria

The area is an area of high natural productivity and of essential habitat for wildlife. In addition to containing prime salmon spawning reaches, the lower reaches of Big Creek serve as a staging area for a large population of swans.

Area Description

This AMSA extends from King Salmon along the Naknek River to the federally owned land of Katmai National Park. It includes the upland on both sides of the river as well as the first three miles of Big Creek.

Status of Area

The area north of the Naknek River is owned by Paug Vik Corporation and the area south of the river is owned by the Alaska Peninsula Corporation. The Bristol Bay Borough has planning and zoning jurisdiction over the area; the state and federal government have specific jurisdiction over the river. This area is presently used for recreation, fisheries research and management, and subsidence and sport hunting and fishing.

Status of Adjacent Area

Katmai National Park is east of the recommended AMSA. The community of King Salmon is directly to the west. All of the remaining contiguous land has similar ownership, management jurisdiction and use.

Potential Conflict

The uplands area north of the Naknek River that border the rapids area and Katmai National Park is some of the most attractive and developable land in private ownership within the Borough. There has already been some discussion of a 5-acre, 99-year lease program for residential development by Paug Vik Village Corporation. Along with being attractive and developable, this area also contains the largest concentration of king and pink salmon spawning beds in the Borough and is reputed to hold one of the most significant rainbow trout spawning areas in North America. Lower Big Creek also serves as a staging area for a large population of swans. Uncontrolled development, or poor construction procedures could disturb or destroy an area that is both valuable and irreplaceable. Any development in this sensitive area must be approached cautiously and in a way that maintains the natural values and unique resources.

Management Objective

This AMSA contains a variety of natural values, is privately owned, and is attractive for development. A management plan would determine the highest and best use of the area. Once a use determination has been made, a management plan would be developed that outlines guidelines to protect the migration corridor and important salmon and trout spawning beds.

APPENDIX ONE

CULVERT INSTALLATION STANDARDS*

Each culvert placed in a river or stream frequented by fish should be installed so that at last one-fifth of the diameter of each round culvert and at least six inches of the height of each elliptical or arch type culvert is set below the streambed at both the inlet and outlet of the culvert. This does not apply to bottomless arch-type culverts. A variance may be granted to avoid solid rock excavation.

Table 1 of this appendix represents water velocities through different culvert lengths which can be successfully negotiated by several Alaska fish species. Average cross-sectional velocities at the outside of the culvert should not exceed the velocities in Table 1 of this appendix except for a period not exceeding 48 hours during the mean annual flood.

Adequate water depths must be maintained during low flow periods to provide passage through culverts. Existing water depths at crossing site must be measured and maintained after culvert installation. It should be the responsibility of the developer to design a culvert to accommodate upstream movement of the slowest swimming fish species or age class using the system. Proposed dimensions must be submitted to the Department of Fish and Game for approval.

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*Seaman et al., 1981.

Each culvert should be placed in and aligned with the natural stream channel. All bank cuts, slopes, fills, and exposed earthwork attributable to culvert installation in streams, rivers, or lakes should be stabilized to prevent erosion during and after the project. Culverts should not be installed in areas used for fish spawning or rearing. Alternative drainage structures should be installed if these requirements cannot be met. Alternative drainage structures may include bridges or modified culverts approved on a site-specific basis.

The following references can be used to compute culvert diameter when given the known fish passage criteria from Table 1 of this appendix, and the stream discharge data for mean annual flood. These references are available for inspection at state or federal libraries in Juneau, Anchorage, or Fairbanks.

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Table 1

Average Cross-Sectional Velocities in Feet per Second
Measured at the Outlet of the Culvert

Group I - Upstream migrant salmon fry and fingerlings when upstream migration takes place at mean annual flood.

Group II - Adult and juvenile slow swimmers: grayling, longnose suckers, whitefish, burbot, sheepfish, northern pike, Dolly Varden/ Arctic char, upstream migrant salmon fry and fingerlings when migration not at mean annual flood.

Group III - Adult moderate swimmers: pink salmon, chum salmon, rainbow trout, cutthroat trout.

Group IV - Adult high-performance swimmers: king salmon, coho salmon, sockeye salmon, steelhead.

Length of Culvert (in feet)	Group I	Group II	Group III	Group IV
30	1.0	4.6	6.8	9.9
40	1.0	3.8	5.8	8.5
50	1.0	3.2	5.0	7.5
60	0.9	2.8	4.6	6.6
70	0.8	2.6	4.2	6.0
80	0.8	2.3	3.9	5.5
90	0.7	2.1	3.7	5.1
100	0.7	2.0	3.4	4.8
150	0.5	1.8	2.8	3.7
200	0.5	1.8	2.4	3.1
>250	0.5	1.8	2.4	3.0

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